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INDIAN EDUCATIONAL REVIEW

□ PURPOSE

Indian Educational Review is published quarterly in January, April, July and October, by the National Council of Educational Research and Training, New Delhi. The purpose of this journal is to provide a medium for dissemination of educational research and exchange of experience among research workers, scholars, teachers and others interested in educational research and related fields and professions.

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Indian Educational Review invites papers on or pertaining to educational research with emphasis on research problems in Indian education. The editors entertain the following types of material :

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2. Papers that make a significant contribution towards developing a theory.
3. Papers that summarize and discuss an outstanding study or a piece of educational research.
4. Papers that review significant research in important areas.
5. Letters to the Editor on important research problems.

The emphasis is on categories 2, 3, 4 and 5. Ordinarily, a paper is not accepted if it has appeared in print or in any form elsewhere. Exceptions may be made for contributions which the General Editor

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Measurement of Self-Concept

Review of Researches

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EVER SINCE Descartes, a tradition concerned with the development and functions of the way people view themselves has been prevalent within the literature of education, philosophy, and the social sciences. However, this tradition has been less than clear in its support of the utility of various self-concept notions.

Zirkel (1971) counted 15 definitions of self-concept explicitly cited among the studies reviewed by him (116 references). Several other definitions were implicit in the various instruments and designs of the studies. Several overlapping terms, e.g. self-concept of ability, self-esteem, self-image, sense of personal worth, self-perception, self-report, were used to differentiate among definitions.

The lack of precision in defining self-concept is reflected in the lack of effective instrumentation. As Kubiniec (1970) pointed out, "the same instruments are employed to measure different self constructs and the same constructs are measured by different instruments." Stanwyck and Felker (1971) concluded that self-concept results were "useless without knowledge of the instrument used for the measurement and definition of self-concept from which the instrument was derived." In this paper self-concept is discussed in view of some researches carried out in India and abroad.

Defenitions of Self-concept

Pathak (1966) conducted an investigation to study vocational choices in relation to self-concept. According to him self-concept is : "The organized, consistent, conceptual gestalt composed of perceptions of the characteristics of the 'I' or 'Me', and the perceptions of the relationships of the 'I' or 'Me' to others and to various aspects of life, together with the values attached to these perceptions. It is partially definable in operational terms by means of a Q-sort".

He defined ideal-self as : "The self-concept which the individual is most likely to possess, upon which he places the highest value for himself".

Guller (1967) gives an operational definition as "Subjects responses to questionnaires composed of self-referrent statements relating to interpersonal relationships and social desirability".

Mehta (1968) defined self-concept as : Organized configuration of perceptions of the self which are admissible to awareness. It is composed of such elements as the perceptions of one's characteristics and abilities; the percepts and concept of the self in relation to others and to the environment; the value qualities which are perceived as associated with experiences and objects; and goals and ideas which are perceived as having positive or negative valence.

According to Pandit (1969), "Self-concept is the nucleus around which the entire personality structure revolves in its homeostatic process of maintaining consistency and stability within the individual personality".

For Desai's (1979) study self-concept was so defined as to include perceptions of self, perceptions of college, and perceptions of the social milieu.

Operationally self-concept consisted of the subject's responses to three sets of elements :

1. *Self* : "Me", "Me as a student", and attitudes towards own group.
2. *College* : "Teachers" and "The grading (examination) system".
3. *Social Milieu* : "Opportunities for making friends", "Social activities", "Community acceptance of me", and attitudes of other groups towards his group.

Variables Related to the Self-concept

Akirt (1959) has studied inter-relationships among various dimen-

sions of self-concept such as (i) Academic values, (ii) Inter-personal relations, (iii) Sexual adjustment, and (iv) Emotional adjustment.

The study undertaken by James and Robin (1961) focussed on the relationships between the three socialization variables of parental identification, religious affiliation, and social class to self-concept. Pathak (1969) has studied occupational choices in relation to self-concept.

The main object of the study made by Herbert (1967), was to find the dimensions of self-concept in teacher trainees as they imagine themselves in the role of teachers.

The study by Deo (1967) was based on self-concept and disciplined or indisciplined behaviour. Mehta (1968) has worked on the self-concept of underachievers and achievers among high school students. Sharma (1968) examined in his study the relationship of self-concept and general anxiety with school achievement.

Pandit (1969) has studied the following relationships : (i) sex-differences and self-concept, (ii) parental identification and self-concept, and (iii) the interaction of social class and self-concept. Soares and Soares (1969) examined the self-concept of advantaged and disadvantaged pupils. Mathew's (1971) research involved the following variables : (i) the general effect of stress and support to the self-esteem, (ii) personality characteristics and self-esteem changes. Zirkel (1971) and Luck and Heiss (1972) related self-concept to socio-economic status. Cooper (1972) has studied the self-concept of Negroes, Spanish-Americans, Indians and Anglos.

There were following variables in the study by Trowbridge, Trowbridge and Trowbridge (1972) : (i) sex, (ii) age, (iii) socio-economic status, and (iv) rural-urban area.

In the study by Vasantha (1972), the variables connected to self-concept were : (i) The influence of the family like parental interaction, parent-child interaction, and sibling interaction ; (ii) Social interaction ; (iii) Teacher's influence ; (iv) Sex ; (v) Religion ; (vi) Body characteristics ; (vii) Socio-economic status ; (viii) Physical health ; (ix) Psychological variables like difference in age, the influence of success and failure and problem of adjustment, and (x) Learning.

Vasantha (1973) has studied the relationship of size of family to self-concept and relationships between self-concept and achievement for groups classified on the basis of size of the family. Patel (1973) examined the influence of the counselling treatment to the self esteem. Husami (1974) has examined the relationship of need for achievement and self-esteem among male college students. He also studied the influence of cultural variability on that relationship.

Deo and Bhullar (1974) included the following variables in their study of self-concept : (i) physical efficiency, (ii) intelligence, and (iii) achievement

Fein, O'Neill, Frank, and McCollvetit (1975) have examined the influence of sex-differences on self-esteem. In Desai's research (1979), following variables, related to self-concept, were studied : (i) faculty, (ii) college-size, (iii) social class, (iv) religious affiliation, (v) social group membership, (vi) sex, (vii) age, and (viii) birth-order.

Methods of Measuring Self-concept

Robert (1959) has used Q-technique, developed by Stephenson. The method seemed well-suited to measuring self-acceptance both totally and in various dimensions of the self-concept.

In the study by James and Robin (1961), the two aspects of self-concept, dominance and love, were measured by the interpersonal checklist. This method consisted of 128 adjectives or phrases grouped into eight behavioural categories or octants. The subject was instructed to check those adjectives or phrases which best described himself. Parental identification was measured in terms of the greater perceived similarity to one parent in contrast to the other on the semantic differential. Each subject rated himself, his mother, and his father on 14 seven-point scales between each of the bipolar adjectives.

In the study by Pathak (1966), Q-technique was used for measurement of self-concept. In this Q-technique, the subject was presented with verbal description and was asked to make forced choices to group the material into a normal frequency distribution.

The instrument used in Herbert's (1967) study, was based on the semantic differential technique. The 26 scale items of interest here were in the seven-point semantic differential format. The directions for this part of the questionnaire instruct the subject to rate the concept 'Myself as a teacher' as he imagined himself as a teacher.

For studying the self-concept, Deo (1967) used her personality word list. Mehta (1968) obtained data regarding self-concept through the group administration of a self-concept inventory. Items were written to describe the following dimensions of self-concept : feelings of inadequacy, emotional instability, withdrawal tendencies, positive attitude towards achievement, prestige and recognition, and self-confidence. The first three dimensions were considered negative, the other two positive. The inventory consisted of 136 items, 58 of which described the three positive

dimensions, and 78 the two negative dimensions. The subjects were asked to indicate for each item whether or not it was true for them

In the study by Williams and Byars (1968) the Tennessee self-concept scale, a standardized Likert-type instrument, was used in assessing self-esteem. The Tennessee scale provides an assessment of physical self, moral ethical self, personal self, family self, social self and total positive self.

Jorgenson and Howell (1969) measured the self and ideal concepts by means of a semantic differential instrument, utilizing 20 pairs of bipolar adjectives with a nine-point scale between each pair.

Pandit (1969) took the help of Sarbin's personality word list for the purpose of measuring self-concept. This instrument has seven different areas. There are 14 positive statements under each of the seven areas. The subjects were asked to tick-mark against those statements that they thought applied to them. Each subject rated himself, his father, and his mother on 14 nine-point scales between each of the bipolar adjectives. Cooper (1972) used semantic differential technique.

Husaini (1974) obtained a global measure of self-esteem as well as semantic differential ratings of actual and ideal self. The global measure of self-esteem was obtained by administering Rosenberg's self-esteem scale. A measure of actual-ideal self was obtained through a semantic differential scale developed specifically for this study. Included in this instrument was a set of 12 bipolar adjective scales taken from Osgood, Suci and Tannenbaum. The subjects were asked to rate themselves first as to the degree to which they actually perceived themselves on these scales at that time, and subsequently, to rate themselves as to how they would like to be on the same scale.

The self-esteem questionnaire, used by Fein, O'Neill, Frank, and McCollvelit (1975) consisted of 26 items, 11 drawn from the popularity factor of the Piers-Harries children's self-concept scale and 15 from the Coopersmith self-esteem inventory. The items were so worded that half of the high esteem responses would be "yes" and half would be "no".

For Desai's (1979) research, the instrument was based on the semantic differential technique developed by Osgood. In this method, the subject rates a concept along a continuum between bipolar adjectives. For this study for each element, 11 pairs of bipolar adjectives were selected and organized on the basis of relevance to the research problem. The bipolar adjectives were : good-bad, sharp-dull, ugly-beautiful, strong-weak, slow-fast, shallow-deep, effective-ineffective, valuable-worthless, unfair-fair, intelligent-stupid, and dishonest-honest. Each adjective set was given a score from 1 to 7, that is, a seven-point scale was used.

Findings

1. *Ethnic Group Membership and Self-concept*

The major purpose of the study by Williams and Byars (1968) was to assess objectively the magnitude of self-esteem among Negro-adolescents in what traditionally have been called segregated southern communities. The findings indicated that the Negro students were low in self-confidence, defensive in their self-descriptions, were confused in their self-identity, and similar in their performance to neurotic and psychotic individuals. Negro students attending integrated schools did not differ significantly from those in segregated settings.

Soares and Soares (1969) found that disadvantaged pupils had more positive self-concepts than their more advantaged peers.

DeBlassie and Healy (1970) reported that Spanish-American and Negroes were very like the Anglo sample. Subjects from different ethnic groups did not differ significantly with regard to their overall level of self-esteem.

Cooper (1972) found that adolescent perceptions of self and others did not vary greatly across ethnic group or nationality. Differences were found, to be sure, but the similarities were more striking than the differences. All ethnic and national groups tended to view themselves, the schools, the social milieu, and others with generally favourable perceptions. Mexican pupils tended to perceive their world more favourably than any other group involved in this study. Anglo pupils perceived groups others than their own in a less favourable light.

Desai (1979) found that Patel, Rajput, Brahmin, and Harijan students have almost similar perceptions. All four groups perceive their own groups in the most favourable light. There is a tendency for Harijans to react less favourably. Perceptions of other groups are significantly lower than the perceptions of own groups.

2. *Sex Differences in Self-concept*

Pandit's (1969) conclusions were, (i) self-concept of adolescents was highly positive, and (ii) no significant sex differences were observed in the self-concept.

DeBlassie and Healy (1970) found that sex made no difference in terms of how the subjects perceived their worth, liked themselves, or had confidence in themselves.

Fein, O'Neill, Frank and McCollivelit (1975) predicted that : (i) Male and female self-esteem would be about equal until the fifth or sixth

grade, when female self-esteem would decrease relative to male self-esteem, and (ii) Reading achievement score and self-esteem would be correlated for boys at all ages tested, but only for the younger girls. A third purpose of the study was an examination of sex differences on individual self-esteem items. It was expected that any sex differences found would be primarily on sex-role related items. Researchers found that : (i) The girls' scores remained stable over time, while the boys' scores rose. The sixth grade boys' scores were significantly higher than the second and third grade boys' scores. The sex difference reached significance only in the sixth grade. This tendency was confirmed in the correlations between self-esteem and age. For boys this correlation was small but significant; for girls, it was non-significant. (ii) The relationship between reading score and self-esteem held for boys at each grade level, but not for any of the girls' group.

Desai's (1979) conclusion was that sex is related to self-concept. Female students possess higher perception than the male students.

3. Self-concept and Academic Achievement

Chickering (1962) found that the lower the discrepancy between the self and the ideal self, the higher was the academic achievement in school subjects.

Sharma (1968) investigated the relationship of self-concept (two measures : +ve/-ve self-concept ; and self-ideal discrepancies) with school achievement. The following were the main findings : (i) The value of r between self-concept score (+ve/-ve dimension) and self-ideal discrepancy score was -0.80 , which was highly significant. (ii) Both self-concept scores and self-ideal discrepancy scores were curvilinearly related to school achievement. The coefficients were 0.18 and 0.20 respectively. Thus the subject with very high self-concept as well as those with very low self-concept were low achievers, as compared to those who were in the middle (i.e. those with adequate self-concept), thus supporting the inverted U-hypothesis.

It was hypothesized by Mehta (1968) that negative (undesirable) aspect of the self-concept would be more characteristic of underachievers than of achievers, and positive aspects of the self-concept would be more characteristic of achievers than of underachievers. The two groups were found to differ on a number of aspects of the self-concept, and achievers by positive aspects.

Vasantha (1972) found that : (i) positive relationship existed between self-concept and achievement ($r=0.43$), and between self-concept and

intelligence ($r=0.11$); (ii) High and low achievers could be differentiated on their self-concept scores; they could also be differentiated when drawn from the sub-samples as boys, girls, forward community, urban and rural students, small or big size families, and ordinal position in the family, (iii) Low and high achievers classified on residential area, community and family size could be differentiated on self-concept scores; (iv) Certain demographic and environmental variables like sex, area of residential community, position in family, and educational level of father were related to self-concept as well as achievement, though the degree varied. Self-concept has been shown by this study to be a concept that can be changed and measured.

The aim of Husaini's (1974) study was to examine the relation between need for achievement (n Ach) and self-esteem (SE) among male college students from both America and India. It was found that achievement motivation was positively correlated with self-esteem for Americans but only slightly for Indians. It was also related to different actual-ideal self dimensions for the two samples. These findings suggested the influence of cultural variability upon the n Ach-SE relationship.

Deo and Bhullar (1974) found that no relationship exists between self-concept and intelligence and self-concept and achievement.

4. *Social Group Membership and Self-concept*

The study by James and Robin (1961) focused on the relationships between social class and two aspects of self-concept, dominance and love. He found that upper class subjects have significantly higher dominance scores than lower class subjects, and upper class subjects are significantly higher on dominance than on love.

Rosenberg (1965) found that children from higher social classes were somewhat more likely to accept themselves, that is, to consider themselves worthy than those from lower social class.

Pandit (1969) reported that the interaction of social class had no effect on the self-concept of the adolescents.

5. *Self-concept and Religious Affiliation*

Fuster (1958) studied the relationships between congruence of perceived self-acceptance and ideal self-acceptance and acceptance of others in Indian college students. It was expected that the degree of relationship would vary from one community to another. The mean correlation between perceived self-acceptance and ideal self-acceptance for Hindus was 0.42, for Muslims 0.38, for Catholics 0.29 and for Zoras-

trians 0.46. The congruence scores of each of the communities were again correlated with the total scores of acceptance of others in their respective communities. The resulting correlations of Zoroastrian and of Hindu groups were significant, whereas the correlations of Catholic and Muslim groups failed to reach the level of significance.

James and Robin (1961) investigated the relationships between religious affiliation and two aspects of self-concept, dominance and love. The finding was that Catholic subjects were significantly higher on love scores than on dominance scores.

Desai (1979) reported that Hindu and Muslim students possess almost identical perceptions.

6. Birth Order and Self-concept

Rosenberg (1965) found that the child's birth order in the family had little association with self-esteem.

Desai (1965) found that birth order had no relationship with self-concept.

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Development of Teaching Competence

An Experiment on Integration of Skills

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Twenty inservice teachers were divided into two groups. All the teachers were given training in four selected instructional skills. One group was trained through microteaching. Another group was given to learn from a pre-designed self-learning package followed by efforts of integration of skills. Both the groups were pre-tested and post-tested on BGTC.

THE RESEARCH on student achievement throughout the world and more so in the developing countries, like India, has brought out clearly the teacher education as an important influencing variable (predictor variable) (Husen *et al.* 1978). This crucial position of teacher education in the total framework of education probably puts it to more vehement criticism. In the commonly occurring teacher education programmes—the teaching practice which is supposed to develop the classroom teaching competence is given low priority and also treated casually—the lessons are occasionally supervised and that too often, ill supervised. To counteract this deficiency several innovations have been floated. Among many such innovations microteaching has

been tried out rather throughout the world widely. It has, as a strategy, been tried out rather extensively at the Centre of Advanced Study in Education, Baroda, Government College of Education, Ratnagiri, Technical Teachers' Training Institutes at Bhopal, Calcutta, Chandigarh and Madras. However, microteaching has a comparatively better history of research than implementation.

The first ever research was done as early as in 1966 by Tiwari in the Government Central Pedagogical Institute. The next study was by Shah in 1969. But 1971 onwards there has been a continuous flow of research on this approach. The studies showed consistently that microteaching was (i) more effective than traditional technique (Chudasama 1971, Singh 1974, Bhattacharya 1974), (ii) effective in developing certain instructional skills like questioning, reinforcement, silence and non-verbal cues (Marker 1972, Passi and Shah 1974). Following these studies at the individual levels, NCERT sponsored a large-scale field study on microteaching. In the field study, it has been found that both the standard microteaching technique and modified microteaching technique (for details please refer, Das, Passi and Singh 1978) was more effective than the traditional technique.

All these studies, put together, have tried to respond to the issues like : Is microteaching more effective than the traditional technique ? Is it feasible in the teacher education colleges ? Does it develop teaching skills ? By varying the nature of treatment answers have been sought to questions like : Does differential modelling affect the development of skills ? Is effectivity of microteaching change due to simulated versus real condition, due to variation in time and source of feedback, due to perceptual versus symbolic modelling, due to variation in microteaching cycle, etc. etc. All these studies with all possible variations have actually limited themselves to the development of teaching skill in isolation. However, the effectivity has been assessed through the measurement of general teaching competence on a seven-point rating scale. The assumptions inherent in such a measurement instrument that while teaching a teacher demonstrates a 'total performance' as against demonstration of skills in isolation. Since in any of these studies the integration has not been tried deliberately—it amounted to the assumption that given the training in skills the integration is 'automatic'.

The research in microteaching has three main gaps. The most important one is to examine the effect of training in integration of skills. The second gap in microteaching research is : Can skills be developed through self-learning ? and lastly, can microteaching help the inservice teachers who are already trained ? The present study has really sprang from the needs arising out of these three gaps.

The Study

The study proposed to look for alternative training strategies for teachers in order to improve their teaching competence. Two strategies were tried out in an experimental setting. The objective was to study the effects of the two strategies (treatments I and II) on two different groups of inservice teachers, and also to identify the relative effectivity of the treatment.

Hypotheses

The study was forwarded on the basis of three hypotheses :

1. There will be no significant difference in the general teaching competence of teachers before and after they undergo treatment style I.
2. There will be no significant difference in the general teaching competence of teachers before and after they undergo treatment style II.
3. There will be no significant difference in the gain score on general teaching competence between the two groups of teachers who will undergo treatment style I and treatment style II.

Treatments

Instructional skills training was the general style of treatment. In both the treatment styles four instructional skills were selected for training. In treatment style I regular microteaching approach—plan-teach-critique-replan-reteach-recritique—was used as the cycle for each skill. Treatment style II was a media package designed to incorporate the principles of auto-instruction of instructional skills. The instructional material contained handbooks, taped model lessons, instruction sheets and a small diary. The use of a diary was particularly emphasized. After learning the first skill the teachers were supposed to make maximum use of the skill in a regular class and note in the diary how did she do that. When the second skill was learnt she was expected to try skill 3 in one regular class, and in a progressive sequence the teacher was supposed to try skill 2 in a class followed by skills 1, 2 and 3 in another, and so on.

So in treatment I skills training were given in isolation, and in

treatment II skills training were given followed by integrational efforts in subsumption model. The treatments are presented in the figure (page 16.)

Frame of Experiment

Sample and Formation of Groups

One school (public school) was selected for the present experiment. One and only one criterion for selection of the school was the availability of its consent, cooperation and eagerness to hold the experiment. It, however, provided the facility in terms of having certain homogeneity in the group. Also, if treatments are feasible, it answered the questions whether 'in-school training' is possible.

From the primary and middle school level class 20 teachers volunteered for the experiment. Two periods of each of the 20 teachers were observed on Baroda general teaching competence scale (BGTCS) by trained observers. These teachers were divided into two groups, which matched each other on five criteria mentioned in Table 1. The mean scores and 't' values calculated for items 4 and 5 are also given in this table.

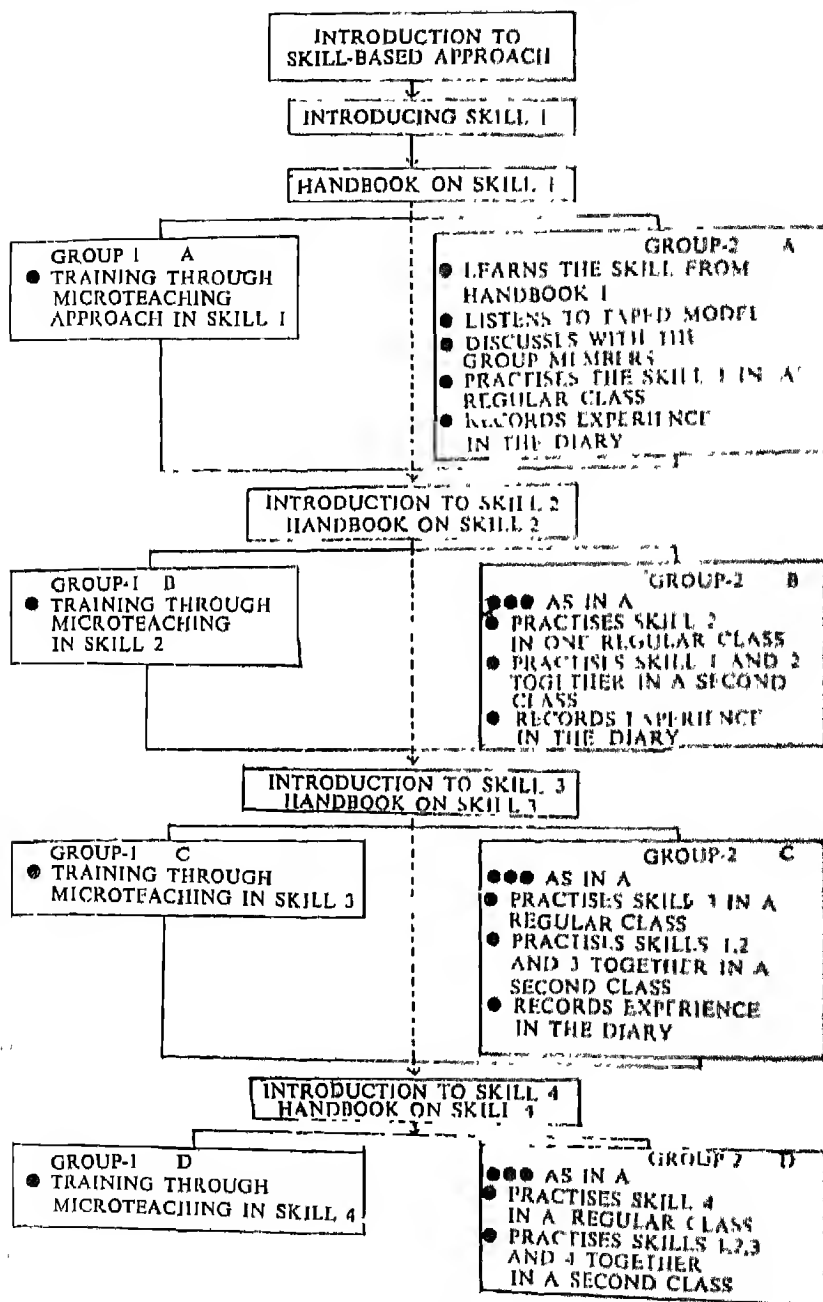
TABLE 1
MEAN SCORES OF CHARACTERISTICS OF GROUP 1 AND 2

Characteristics	Group 1	Group 2	t
	M Yrs.	M Yrs.	
1. Age	34.9	34.7	
2. Teaching experience	10.15	10.30	
3. Score on qualification	5.4	5.75	
4. Attitude towards teaching profession	67.8	68.0	not sig.
5. General teaching competence	117.6	122.5	"

Since all the teachers were ladies, the 'sex' as factor was automatically controlled. Further, from the fact that schools select teachers who have very similar educational and socio-economic background, groups were not tested on SES; instead this similarity was assumed. The teachers

TREATMENT STYLE 1

TREATMENT STYLE II



FIGURE

were also automatically matched on 'trained/untrained' criteria as all but one teacher was trained.

Selection of Skills

Four highly experienced and efficient teachers (as suggested by the principal and other teachers) were given orientation in instructional skills and the process of observation. On a given proforma (BQTC) they were given trials followed by discussion in the group. This had to be repeated four times till the difference in observation was reduced to a negligible minimum. Then these four teachers observed two classes each of the 20 teachers. On the basis of these observations the weakest four areas were identified. These areas are not the weakest areas for each and every teacher. These were the areas of weaknesses for the group as a whole. The four skills were : (i) increasing pupil participation, (ii) stimulus variation with emphasis on pausing and focussing, (iii) fluency of questioning, and (iv) reinforcement.

Tools Used

1. BQTC was used for pre-treatment and post-treatment scores on teaching competence
2. A rating scale on teaching skills
3. Shalini Bhogle's scale for attitude towards teaching
4. School records for age, teaching experience and qualifications.

Materials Used

1. Handbooks on (a) increasing pupil participation by M. S. Lalitha, (b) stimulus variation by Sneha Joshi, (c) fluency in questioning by Bimla Passi, and (d) reinforcement by Bimla Passi (all in Passi 1976).
2. Recorded audio-models on cassettes on the above four skills (developed by the researchers)
3. Instruction sheet (developed by the researchers)
4. Diary (note-book).

Experimental Details*

24 November : All the 20 teachers were given an orientation talk on instructional skill.

26 November : Introduction of skill 1—Increasing pupil participation to Group 1 and 2.

29 November to 2 December : Group 1 practised skills through microteaching in simulated condition. Group 2 learnt the skill from the handbook, listened to taped model and practised in actual classroom.

3 December : Introduction to skill 2—Stimulus variation to Groups 1 and 2.

5-8 December : Group 1 in microteaching sessions. Group 2—skill learning by self and progressive implementation in actual classroom.

9 December : Introduction to skill 3 : Fluency in questioning to Groups 1 and 2.

10 and 12-13 December : Group 1 in microteaching session. Group 2—Skill learning by self and progressive implementation in actual classroom.

14 December : Introduction to Skill 4—Reinforcement to Groups 1 and 2.

15-17 December : Group 1 in microteaching session Group 2—Self-learning of skill 4 and progressive implementation of skills in actual classroom.

On 19 December, again, the attitude scale was readministered, and in the next week, before the Christmas break, all the 20 teachers were observed twice (for 40 minutes period each time) on the BGTC. The average score for each teacher on BGTC was used as the post-treatment score.

Analysis

1. Means and SDs of scores on age, teaching experience, qualifications, attitude scale and teaching competence—pre-treatment and post-treatment—were calculated.
2. The t-test was applied to test the significance of the mean differences on pre- and post-treatment attitude scores and pre- and post-treatment scores on BGTC.

*Pre-experiment : During the third week of November 1977 the teachers were observed on the BGTC. This was followed by administering Shalini Bhogle's attitude scale on 19 November.

The means, t-values and their significance are presented in Table 2.

TABLE 2
MEANS AND 't' VALUES ON PRE- AND POST-TREATMENT
SCORES ON BGTC

	<i>Pre-treatment</i> Mean	<i>SD</i>	<i>Post-treatment</i> Mean	<i>SD</i>	<i>t</i> Values
Group 1	117.6		160.3		6.16**
	Combined SD=	15.50	Combined	12.131	
Group 2	122.5		135.9		2.48*
	Combined SD=	12.10			
t-values	0.91		4.502**		

*Significant at 0.05 level

**Significant at 0.01 level

Table 2 reveals that both the groups gained significantly in teaching competence. This means that both the treatments were effective in developing teaching competence. Whereas t-value in treatment I was significant at 0.01 level, that in treatment II was significant at 0.05 level. In other words, both microteaching and media package with training in integration are useful in training inservice teachers of primary and middle schools. However, the difference of post treatment means of Group 1 and Group 2 is significant at 0.01 level. Hence, treatment I comes out, in this experiment, as a superior technique. Thus microteaching is more effective than its counterpart in this experiment and so none of the three null-hypotheses are found tenable.

Prospects

This experiment, as such, does not offer a package to solve the problems raised in the beginning. But its significance lies in its implication—it leads to a new area for exploration to solve the issues.

The study, like the CASE studies and NCERT field studies on microteaching, proves that microteaching in simulated condition improves classroom teaching competence. Although earlier experiments were limited to pre-service secondary school teachers, this study indicates

new area of extension of microteaching, namely, primary teachers and inservice teachers. Incidentally, since in this experiment the methodology of training (and material) as used in CASE are utilized, it also suggests the validity of Indian handbooks and training styles in training of primary and middle school teachers at inservice level.

The second implication of the study is : given the motivation, instructional skills can be learnt through the media package resulting into significant growth in classroom teaching competence. This is more significant in implication because it is a new dimension in training methodology for inservice teachers and a new vista of research in educational technology. Further, it has several advantages.

Compared to the microteaching sessions where Group 1 needed about 2-2½ hour free from the normal school classes everyday, Group 2 teachers didn't need any such extra facility. Hence it doesn't disturb the normal functioning of the school. Further, the involvement of Group 2 members was noticeable from their discussion in their group and diary recordings.

However, in this study it has not been possible to identify the gains due to efforts on integration. On the contrary, training of skills even in isolation has proved to be a significantly better strategy. The main implication of this study is really raising a few more research issues. These are :

- If the training in skills are maintained similar for both the groups, will one group gain with training in integration of skills? If so, will the gain commensurate with extra efforts, cost, man-hours, etc? Since in most other skilled jobs (e.g. engineering, surgery) the integration is assumed, and also all the studies in microteaching showed that general teaching competence improves with the developments of teaching skills in isolation, should integration of skills be at all considered as an issue of research on instructional skills ?
- Since the study was conducted in public school and from the researchers' involvement it was evident that the general motivational level of the participating teachers were high, how far the results are tenable in other ordinary school situations ?
- Lastly, even a casual calculation of the cost of training (not reported in this study) reveals that cost of training through the self-instructional kits are much cheaper than the cost of training by the trainers. Also, self-instructional kits have the advantage of being used even in such places where expert trainers are not

available Should we try to develop more such multi-media kits for learning skills than depend upon the trainers ?

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11

Impact of Training Media

A Unique Experiment

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IN INDIA, 70 to 80 per cent of its population engaged in farming are served by institutional and non-institutional training programmes. The most common medium which is in vogue is black board. Handouts are given to trainees. Sometimes charts, black and white slides are used by few trainers. Howsoever well developed a training system may be, it cannot have the desired impact on the minds and actions of the trainees with the use of conventional media.

The need in the development of effective but inexpensive sound-vision mixed media is being increasingly felt at all levels in training programmes. With the advancements in audio-visual technology, 'slides-synchronized tape programme' has an edge over the use of 'slides along with lecture'. Its relative merit is that material in a slide is reinforced by pre-recorded carefully worded commentary and special effects which create an intensive impact on trainees. On the other hand, some trainers argue that when slide and tape medium is employed, the presentation loses its flexibility, it is no longer under direct control of the trainer. However, there is no empirical evidence on the impact of slide/tape programme on the gain and retention of knowledge over slide along with lecture medium. In western countries, slide and tape medium has become very popular and it is replacing slides along with lecture in teaching and training programmes. So, it is highly imperative to study the impact of slides-synchronized tape programme versus slides along with lecture

as training media under Indian conditions. Keeping this in view, the present study was undertaken with the following objectives :

1. To develop training media, namely, slides along with lecture and slides-synchronized tape programme on a project.
2. To measure the gain and retention of knowledge of the project taught with slides along with lecture.
3. To measure the gain and retention of knowledge of the project taught with slides-synchronized tape project.

Methodology

The present experiment was carried out with 40 trainees of the agriculture sub-inspector course at the Punjab Agricultural University, Ludhiana. The trainees were divided into two equal groups G1 and G2 according to their previous academic performance so as to ensure homogeneous representation in groups (Table 1).

TABLE 1
DISTRIBUTION OF TRAINEES ACCORDING TO THEIR ACADEMIC PERFORMANCE

<i>Percentage Marks before Admission</i>	<i>Number of Trainees</i>	<i>Groups</i>
Above 70	2	G1
60—65	18	
	<hr/> 20 <hr/>	
65—70	17	G2
Below 60	3	
	<hr/> 20 <hr/>	

Development of Training Media

In order to develop training media, i.e. slides along with lecture and slides-synchronized tape programme, the following procedure was followed :

1. The syllabus of the agriculture sub-inspector course was re-

viewed for selection of theme for the project. The final selection of the project 'poultry to supplement income' was made after discussion with the trainers of poultry subject.

2. The project was analysed into its vital points as : (a) rearing, (b) feeding, (c) disease care, and (d) marketing. The vital points were further divided in consultation with subject matter personnel into 40 sub-points.
3. A story board card was developed for each vital point and sub-points to tell a story. Each card carried information about image and sound (including commentary, music and special effects) as shown in Fig. 1.

STORY BOARD CARD				Sr No																
Sound (Commentary Music,Special effects) <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>		Image <div style="border: 1px solid black; height: 100px; width: 100%; margin-top: 10px;"></div>																		
<div style="border: 1px solid black; height: 100px; width: 100%;"></div>		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">Title</td> <td style="width: 35%;"></td> <td style="width: 15%; text-align: center;">Scene</td> <td style="width: 35%;"></td> </tr> <tr> <td style="text-align: center;">Drawing</td> <td></td> <td style="text-align: center;">Location</td> <td></td> </tr> <tr> <td style="text-align: center;">Collage</td> <td></td> <td style="text-align: center;">Length</td> <td></td> </tr> <tr> <td style="text-align: center;">Live Situation</td> <td></td> <td></td> <td></td> </tr> </table>			Title		Scene		Drawing		Location		Collage		Length		Live Situation			
Title		Scene																		
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Duration of this slide — Progressive total —		Notes <div style="border: 1px solid black; height: 50px; width: 100%; margin-top: 5px;"></div>																		
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Fig. 1

4. The duration for presentation of slide was determined on the basis of its image and sound. The progressive total of time for the package of slides-sound on the project worked out to 20 minutes.
5. Slides are taken as per image specifications on the story board cards, i.e. title, drawing, collage, live situation. These were arranged in order of sequence.
6. The commentary along with music was recorded on the cassette tape as per slide sequence with a pause of sound of the bell after each slide to serve as an indication for changing the slide while presentation.

7. The special effects were superimposed as and where needed on the tape synchronized with slides so as to create impressions of live environment.
8. Instructional package (containing 40 slides, cassette narration tape of 20 minutes, trainer's notes, evaluation sheet, copy of script) was developed to serve as new training medium vis-a-vis the slides along with lecture medium on the project.
9. The training media were validated by ensuring that all the aspects of 'poultry to supplement income' under study were covered.

Administration of Training Media

Two groups of trainees—G1 and G2—were assigned to two separate medium, i.e. G1 training imparted through slides along with lecture and G2 training imparted through slides-synchronized tape programme. An objective test consisting of true/false and fill-in-the-blank questions was prepared on the project for collecting the data. Tests for measuring the gain in knowledge were administered immediately after exposure to media. Tests for the retention of knowledge were administered after 4 weeks of interval. The data were analysed with analysis of variance and tested at .05 level of significance.

Findings and Discussion

In order to measure the gain in knowledge of the training project 'poultry to supplement income' imparted with the help of slides along with lecture to group G1 and slides-synchronized tape programme to group G2, the difference between two training media scores was obtained. The data were subjected to F-test given in Table 2.

TABLE 2
ANALYSIS OF VARIANCE FOR GAIN IN KNOWLEDGE

<i>Observation</i>	<i>Training Media</i>		<i>F-ratio</i>
	<i>Slides along with Lecture</i>	<i>Slides- synchronized Tape Pro- gramme</i>	
	(V1)	(V2)	(V2/V1)
Immediate recall	4.8	14.19	2.95*

*Significant at .01 level

The calculated value of F (2.95) greater than F 5% (2.08) was significant, proving thereby, that there was significant difference between the two training media. Besides, the results of the statistical analysis revealed that trainees imparted training with slides-synchronized tape programme were significantly superior to gain in knowledge to the trainees imparted training with slides along with lecture medium.

Further, the retention of knowledge about the project was measured over four weeks of time as shown in Fig 2.

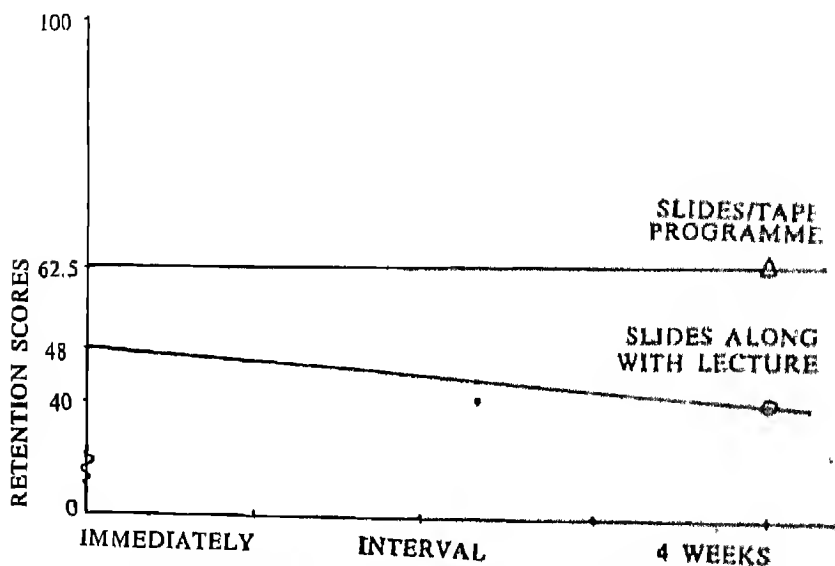


Fig. 2. Post-test retention scores measured over time

On comparing the retention scores of the slides-synchronized with tape vs. the slides along with lecture, it was found that retention was significantly better with slides-synchronized tape programme: 14.5 per cent better immediately after having the project presented, 22.5 per cent better after four weeks.

Conclusion

The study revealed that slides-synchronized tape programme has better impact on the trainees over the slides along with lecture medium. Further, it was observed that the use of slides/tape programme served as an effective attention-getting, interest-maintaining medium that motivated

the trainees to watch the project 'poultry to supplement income' more carefully and pay particular attention to its vital ideas reinforced with special effects and this, in turn, enabled the trainees to learn more and retain longer. As a result, it is highly recommended that slides-synchronized tape programme may be used to strengthen the training programmes. Thus, there is a need for the development of validated slides-synchronized tape packages on training projects at the national level to economize time and cost for various training centres and institutes.

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Developing Instructional Strategies

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THE TEACHING is a complex process and we lack definite knowledge of its essential components. It has been observed that our desire is far greater than our knowledge of how to improve teaching. However, as with any complex human behaviour, its final analysis and enlightened practice must rest on basic research on behavioural processes (Rath *et al.* 1971). The methodology of teaching has now become one of the most pressing problems in the educational setting and consequently has led to significant instructional practices and research in developing instructional strategies. Recently there has been lively interest in constructing teaching paradigm that have heuristic value for classroom practices, experimental testing, programme of instruction and research on teaching, such as Gage (1963), McDonald (1965), Bruner (1966), etc. These paradigms are highly speculative and some of these are difficult to reduce to experimental testing. None appears to include the organismic behavioural, social and cultural attempts to embrace all the major classes of variables may prove to be more of a philosophical reflection than a serious programme of classroom practices and research. The teaching paradigms that have some promise to produce significant research and improved practice would obviously be incomplete description of teaching and yet they are most operational and testable paradigms (Gage 1963).

Educational researchers are discussing that they cannot look to psychology alone for their guiding cues and principles (Ausubel 1969). With the advent of action research, microteaching, educational technology, programmed instruction, etc. educational researchers may

even contribute a technique or two to psychological research. The development of instructional programme and research on teaching has led to the realization of the fact that straight forward application of SR learning theory including both classical and operant conditioning, do not necessarily result in successful teaching technique or programme (Gagne 1962). The problem of applying laboratory findings to the field, i.e. the classroom has to be resolved by instructional programme, classroom practices and research again not by ready extrapolation (Melton 1959). Reinforcement, for example, may be a fairly precise operation in the experimental animal chamber. In the classroom and even in the skill learning it is an entirely mysterious mixture of motivation, feedback and reward (Annet 1964).

Guided Learning

In developing instructional strategies for teaching of concepts, 'discovery learning and inquiry training' are perhaps the most seminal concepts to inspire instructional programmers and investigators to undertake classroom practices and research on teaching. These ideas have been inspired by the report of Wood Hole on Cape Cod Conference, reported by Bruner. As observed by Bruner (1960, p 20) :

Mastery of fundamental ideas of a field involves not only the grasping of general principles, but also the development of an attitude towards learning and inquiry, toward guessing and hunches, toward the possibility of solving problems on their own...To instill such attitudes by teaching requires something on which a great deal of research is needed, but it would seem that an important ingredient is a sense of excitement about discussing discovery of regularities of previously unrecognized relations and similarities between ideas with a resulting sense of self-confidence in one's abilities.

However, the subsequent debate on these ideas led not only to posit that anything can be taught to a child at any stage, provided it is presented in an honest and interesting way but also to a position that "Knowing is a process not a product" (Bruner 1967).

Thus a number of teacher-educators and educational psychologists particularly Ausubel (1961), Gagne (1967), and Shulman (1966) are critical and advocate sequencing of learning task in such a manner

that students are guided to discover but also to learn how to discover. For example, Gagne had advocated that an effective problem-solver has to acquire mass of structurally organized knowledge made up of content principle not a heuristic one (Gagne 1965). It is because of this that Shulman identifies Gagne's approach to instruction a different one from that of Bruner. According to Shulman (1968) Gagne starts with the task analysis of instructional objectives and insist on stating capabilities in specific behavioural terms.

Thus the debate amongst these advocates of 'inducting the child into the structure of the discipline' has alternately led to the concept of 'guided discovery' which consists not only in organizing knowledge structurally in a sequential ordered form, but also inducting the child in such a way that he acquires the knowledge through the process of inquiry, instructional practices and research.

The Teaching of Languages

Research on teaching of languages—first language or second language—may be somewhat less impressive in their contribution to theories of teaching but modest accomplishments point to sound instructional programmes and research directions (Carroll 1960). Linguists may make their contributions to education not directly, suggesting modification of teaching practice, but indirectly in enabling research in education to understand the higher order language structures that must be taken into account for developing instructional strategies. Similarly, psychologists may not directly contribute by suggesting modification of teaching techniques but indirectly by helping researchers in education to understand the higher mental processes that must be taken into account for developing instructional strategies and for testing and evaluation of accomplishment by the learners. The psychologists may help the classroom practitioner and researcher in education to understand the higher order language structures or higher mental processes or both. Educational theoretician or educational philosophers may speculate 'why' and 'what' of the manner the child ought to acquire communication competence and semantic control. But ultimately it is the responsibility of educational researchers to analyse teaching-learning processes and identify the elements that might help to guided instruction in the classroom (Ausubel 1963).

Thus instructional practices and research on instruction or research on learning presents a design developed for instructional strategies.

Kersh and Wittrock in considering how discovery teaching may depart from directive teaching techniques and programmed instruction and alluding to the ordering of the experiences that either teacher or student must provide have developed a useful scheme for classifying teaching methods along with a continuum of greater or lesser teacher participation in the learning process. The classification enables one to fit into a single dimension the degree of inductive and deductive teaching. In their broad but operational view of teaching methodology they include the nature of learning task, the students' level of motivation, skill and the provision for classroom practices and reinforcement (Kersh and Wittrock 1962).

Taba Elzey and Suchman have developed their instructional strategies based on Piaget's concept of assimilation and accommodation and discuss the strategies that teachers should adapt in moving from one level to another level of thought. For example, to Kersh and Wittrock discovery is learner's goal-directed behaviour while he completes the task by himself. From this point of view the amount of guidance and direction provided by the teacher will be a key variable to determine the discovery process because in practice considerable amount of guidance and direction has to be provided by a teacher while the learner may be learning by discovery—the process ought to be qualified or called guided discovery (Kersh and Wittrock 1964).

Thus the guided discovery advocated by Gagne is an explicit concern of Taba and Elzey, who investigated types of instructional intervention on teaching strategies. The intervention is designed to stimulate productive and creative thought, what is later described as inductive discovery. Suchman employs the subject-matter of science and in effect he teaches in some general way 'scientific thinking'. His method is more of 'learning by asking questions' than of 'learning by discovery'. His purpose is to teach children how to formulate hypothesis and to test them through verbal form of controlled experimentation and to interpret results. He does not design his research in terms of particular educational outcomes (Suchman 1960). Well, in the learning by discovery approach the teacher also asks questions and the children reach their own inferences. The method in the main consists in teaching the child not a particular concept or principle but also inquiry processes. The inquiry training, according to Suchman, should supplement rather than replace other teaching strategies, though his programme does not specify the conditions under which it should be used, in terms of tasks, students' capabilities and time variables.

Developing Instructional Programmes

In view of the above, an effort was made to articulate the learning by discovery and inquiry training approach for formulating instructional strategies to teach Hindi as a second language to Urdu-medium students. The analysis of data provided by Urdu-medium and Hindi-medium students led to the realization of the fact that Urdu-medium students in spite of interaction in common community situations and in spite of common curriculum programme, fail to achieve the level achieved by Hindi-medium students in those higher order structures of Hindi which are specific and characteristics of school-medium level of Hindi language (Tarang 1979). To identify the reference abilities which could account for differences in overt accomplishment of Urdu-medium and Hindi-medium students in higher order language structure of Hindi, the factors extracted from the correlation matrix of 22 variables, led to identification of common, though sometimes differentiated factors in case of both the groups. On the basis of this factor analysis factor A—production of morphological system, could be presumed to be the reference ability explaining the variance in a number of tests. These tests, thus, provided measures of one of the important higher order language structure, viz, production of morphological system, which determines the communication competence and semantic control of Hindi language. This language structure was selected to develop and experimentally try out instructional strategies based upon 'learning by discovery' and 'inquiry training' as discussed in the preceding section.

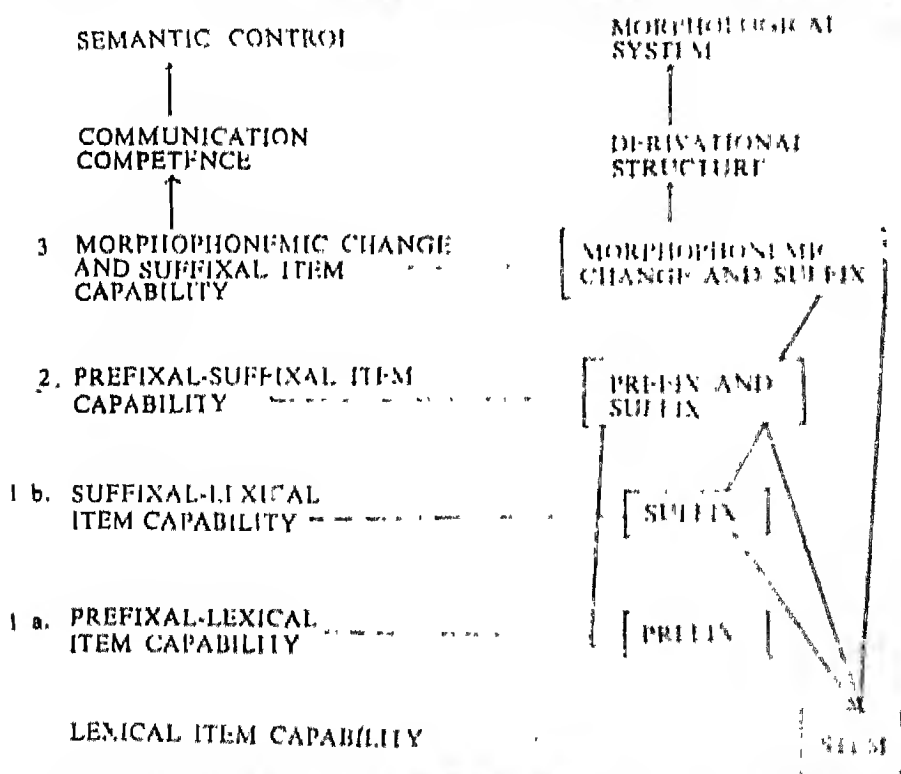
However, the production of morphological system requires pupils' capabilities not only in derivational structure but also in case of changing phrase into words, Sandhi, applied grammar, samas, contextual meaning at word level, stylistic transformation and alternation, etc. The derivational structure being one of the higher order structure of Hindi language common to Urdu-medium and Hindi medium students both in terms of significant difference in achievement as well as having highest loadings on reference ability-production of morphological system, an attempt was made to experimentally try out instructional strategies for teaching the production of morphological system—derivational structure.

The first step towards developing instructional programme was to identify the various levels of capabilities and prerequisites to achieve these capabilities as well as the various levels of semantic control for communication competence that these prerequisites and capabilities would help in acquiring. This two-way task is necessary from the point

of view of experimental pedagogy in as much as the empirically worked out concepts of linguistics can be made for teaching of language in a classroom situation. This is so because a grammatical concept cannot be treated as an end in itself or in isolation. For, the grammatical concepts have necessary relationship with a concrete context in terms of communication and meaning. The instructional programme was so developed that the capability-mastery of derivational structures for production of morphological system was articulated with semantic control for communication competence with reference to concrete contextual meaning that a pedagogical need of teaching a language was realized.

The Flow Chart of Prerequisites and Capabilities

The following figure broadly identifies the prerequisites and capabilities of morphological system—derivational structures as well as



Hierarchical flow-chart of prerequisites and capabilities of the morphological system—derivational structure and semantic control for communication competence in these derivational structures.

semantic control for communication competence in these derivational structures.

The final differential of prerequisites and capabilities was made while developing the work-book. For example, in case of prefixal derivational structure—morphemes (bound+free) three prerequisites were identified, viz. lexical and derivational items of (a) pair of words used in a pair of sentences, (b) two pairs of words used in a pair of sentences, and (c) three pairs of words in a pair of sentences. The production of derivational structure presumes that a minimal level of lexical capability has been achieved for the identification of free morphemes and bound morphemes, i.e. stem structure or root and prefix which can be termed as prefixal-lexical items and suffixal items shall consist of stem structure or root and suffix.

The prefixal-lexical item presumes a capability to combine stem and prefix or bound morpheme and free morpheme, in such a way that a new lexical item can be formed and used in a context. Similarly, suffixal-lexical item presumes a capability to combine free morpheme and bound morpheme in such a way that a new lexical item is formed and pattern of derivational is mastered and used in a context, i.e. a meaningful communication. It is only when these two capabilities are achieved that they become prerequisites for a higher order capability to separate the stem and affix or to infer rules for pattern of allixes, i.e. by identifying free morpheme and bound morpheme combinations with semantic rules that prefixal and suffixal-lexical items of derivational structures are learned.

The combined prefixal and suffixal lexical items (in which both, prefix and suffix have been added) entail the capability of combining bound morpheme and free morpheme pattern with a free morpheme (stem) and again, with a bound morpheme pattern. This requires not only an identification of prefixal and suffixal pattern in which a free morpheme is fixed but also a discrimination of the pattern in which a free morpheme can or cannot be combined with a bound morpheme either before or after. It is with this capability that the learner can make use of prefixal and suffixal-lexical items in a context.

The prefixal-suffixal capability is the prerequisite for still higher order derivational structure. The combination of free morpheme and bound morpheme gives rise to morphophonemic change in the Hindi language derivational structure. As the pattern of morphophonemic change (Sandhi) is governed by a suffixal-bound morpheme pattern alone, this capability has been identified as suffixal and morphophonemic modification of lexical items. It is only when this capability is achieved that

the learner would be able to produce derivational structure according to the morphological system of Hindi language as well as the semantic control at the equative level for communication competence and linguistic creativity in Hindi language.

Instructional Objectives

Having identified the capabilities that the Urdu-medium students had to acquire the next step was a task analysis of instructional objectives in specific behavioural terms. There were three kinds of terminal behaviours that Urdu-medium students would acquire after each instructional activity. The behavioural specifications were developed in accordance with the directions and illustrations suggested by Meger (1972) and Gronlund (1969), for each level of mastery of derivational structures.

The task analysis on the basis of which instructional objectives were formulated in behavioural terms arose out of concern for 'guided discovery'. That is to say that not only the product objective in terms of the capabilities to be achieved were identified, but also the process objectives of 'guided discovery' and/or 'inquiry training' were taken into account. It is on the basis of instructional objectives such as these that the instructional programmes and strategies were formulated for each level of derivational structures.

Developing Instructional Material

To achieve the instructional objectives regarding derivational structure a selection strategy to choose instructional material had to be designed. It became all the more important to maintain order and sequence in the material. The first consideration was to control the selection of instances according to the level and order of the objectives. Controlling the selection and sequence of instances ensured that the instances (material content) contain information appropriate for a particular derivational structure. The advantage inherent in controlling the selection and ordering of material for the learner was to increase and decrease the cognitive strain involved in the assimilation of information. There were several ways in which the assimilability of information could be controlled by choosing material in certain order within a sequence.

On the other hand, selection of instances in an order and sequence for the instructional programme was to control the degree of risk

involved. The selection and sequence of instances would present appropriate material before the learner and that the concepts would definitely be attained through methodological techniques adopted by learners after a number of choices. Finally selection and sequence had to be displayed in such a way that it provided opportunity for learning by discovery and inquiry training and also provide opportunities to teachers to use inductive method to arrive at inferences or generalizations regarding pattern of derivational structure and deductive method providing opportunities for production of morphological system and semantic control for communication competence.

Developing a Work-Book

In view of these advantages of selection of ordered material in a sequence the instructional programme was designed in four units :

1. Prefixal-lexical item capability programme
2. Suffixal-lexical item capability programme
3. Prefixal-suffixal lexical item capability programme
4. Morphonemic change and suffixal-lexical item capability programme.

In each unit of these derivational structures the pupils were first presented with the actual content material either in the sentence form (in pair of basic lexical items and derivational ones) or in passage form wherein lexical item together with different derivational patterns were presented. This helped the teacher to provide an opportunity to help students identify the various facets of a derivational structure. This was followed by specific exercises to master the linguistic competence to separate the basic lexical items (stems) and affixes and then to identify variance in semantic implications of these items. Both of these in turn provided significant ground to discover the derivational patterns governed by semantic control. After having ensured that pupils did discover the semantic rules for derivational pattern either by examining the statement on the work-book itself or by providing special exercises, the teacher was provided an opportunity to give special exercises either structured—given in the work-book or unstructured—through interrogatory conversation, supervised study and individual guidance at correctional stage.

Experimental Try-out

Fatehpuri Muslim Higher Secondary School and Mazharul Islam Higher Secondary School were selected from amongst Urdu-medium schools of Delhi for the purpose of experimental try-out on the basis of earlier analysis (Tarang 1979). The vocabulary test was administered to Urdu-medium students of Class VIII. The achievement scores are given in Table 1.

TABLE 1

<i>Schools</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>SED Mean</i>	<i>t-Value</i>	<i>SED Mean</i>	<i>t-Value</i>
1. Fatehpuri Muslim H.S.S.	70	29.41	7.10	1.38	.225	.085	1.01
2. Mazharul Islam H.S.S.	50	29.10	7.96				

A perusal of Table 1 shows that both the groups of Urdu-medium schools were equivalent in their achievement of Hindi vocabulary test, i.e. mastery of lexical structures—a prerequisite for the present experimental study.

Mazharul Islam Higher Secondary School was then randomly selected by the toss of coin as experimental group and Fatehpuri Muslim Higher Secondary School as control group. Ramjas Higher Secondary School was selected from amongst Hindi-medium schools as cross-control group on the basis of this analysis (Tarang 1979).

The pre-test and post-test on derivational structures were constructed and divided into two parallel tests on the basis of the statistical characteristics of items. The pre-test was administered upon both groups of Urdu-medium students a day before the instructional programme was conducted. The post-test was administered upon experimental and control Urdu-medium groups and cross-control Hindi-medium group a day after the treatment on instructional programme was over. The instructional programme was conducted with the help of a work-book prepared for this purpose for a period of 16 working days according to 'guided discovery' and 'inquiry training' based instructional strategies and on the basis of behavioural specifications identified for each unit of the instructional material included in

the work-book. Table 2 presents the results of the experimental and the control Urdu-medium groups.

TABLE 2

Groups	N	Mean	SD	SED	Mean	t-Value	SED	SD	t-Value
1. Experimental	50	7.94	3.44		.5985	.401	.425		1.223
2. Control	70	7.70	2.92						

A perusal of Table 2 shows that there is no significant difference between the mean achievement of the experimental and control groups of Urdu-medium students on derivational structures at the pre-test stage.

Table 3 presents the results of the pre-test and post-test scores of control Urdu-medium group of students.

TABLE 3

Tests	N	SD	SED	Mean	t-Value	SD	SED	SD	t-Value
Pre-Test	70	.60	.542	1.107		2.92	.384		1.432
Post-Test	70					3.47			

A perusal of Table 3 shows that there is no significant difference between the mean scores of control Urdu-medium group of students at the pre-test stage and post-test stage of derivational structures achievement.

Table 4 presents the results of pre-test and post-test scores of experimental Urdu-medium group of students.

TABLE 4

Tests	N	Mean of Difference (D)	SED Mean	t-Value
Pre-Test	50	4.10	.458	8.951
Post-Test	50			

A perusal of Table 4 shows that there is a marked difference between the pre-test and post-test mean achievement on derivational structures of experimental group of Urdu medium students. This significant difference can be attributed to the treatment given during the experimentation period.

Table 5 presents the post-test results of experimental and control group of Urdu-medium students.

TABLE 5

<i>Groups</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>SED Mean</i>	<i>t-Value</i>
Experimental Group	50	12.04	3.75	.672	7.425
Control Group	70	7.10	3.47		

Table 5 shows that there is a significant difference between mean achievement on derivational structures of experimental and control groups of Urdu-medium students. The higher achievement on the part of the experimental group can be attributed to the treatment.

Table 6 presents the results of experimental and Urdu-medium and cross control Hindi-medium group of students for post-test scores.

TABLE 6

<i>Groups</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>SED Mean</i>	<i>t-Value</i>
Experimental Group	50	12.04	3.75	.69	4.273
Cross-control Group	40	9.10	2.46		

Table 6 shows that there is a significant difference between the mean achievement of experimental Urdu group and cross-control Hindi group students—the experimental Urdu group achieving better than the Hindi group.

Table 7 presents the results of post-test scores of control Urdu-medium group and cross-control Hindi group of students.

TABLE 7

<i>Groups</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>SED Mean</i>	<i>t-Value</i>
Control (Urdu)	70	7.10	3.47	.63	3.174
Cross-control (Hindi)	40	9.10	2.46		

A perusal of Table 7 shows that there is a significant difference between achievement of control Urdu-medium group and cross-control Hindi-medium group of students—Hindi-medium students being superior to control group Urdu-medium students. This table led to the following conclusions :

1. The experimental group and control group of Urdu-medium students were found to be equivalent and belonging to a homogeneous population of Urdu-medium students as far as their achievement in derivational structures at the pre-test was concerned.

2. After the treatment the experimental Urdu medium group has shown higher achievement in derivational structures as compared to both control Urdu-medium and cross-control Hindi-medium groups of students. The experimental Urdu-medium group has done better as compared to control Urdu-medium group, the difference between the mean achievement being highly significant at .05 level. The cross-control Hindi-medium group has lagged behind the experimental Urdu-medium group and the difference of mean achievement is significant at 0.5 level.

3. The instructional strategies under 'guided discovery' and inquiry training' showed better results in the achievement of higher order language structures of Hindi as compared to traditional methods or strategies followed in the Urdu-medium as well as Hindi-medium schools. Thus Urdu-medium students who learn Hindi as a second language can acquire communication competence and semantic control in Hindi equivalent to that of Hindi-medium students, provided special instructional programmes for higher order language structures and characteristic aspect of Hindi language are formulated and conducted to Urdu-medium students, is empirically established.

Considering the fact that the present experimental try-out was restricted to the content area of derivational structures and the reference ability-production of morphological system, the same may be replicated in case of other higher order language structures of Hindi or for that matter, any other reference ability, identified after a careful analysis of the structure of a discipline included in the school curriculum.

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Ways and Practices of Writing Objectives in Mathematics

An Investigative Study

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THE SUCCESS of any work or project depends on its planning, for by careful planning the executor of the work or the project has a clear idea of how the work or project can be implemented leading to its completion. So even for effective teaching, planning is necessary. It helps the teacher in creating a purposeful classroom atmosphere, devising the correct teaching strategies and anticipating the possible situations during instruction. Planning a lesson well ensures that the teacher knows well the content to be taught, strategies to be adopted during the instruction and what is to be expected from pupils during and after the instruction. Roy Medows (1965) calls teaching without or with little written preparation as 'ad-lib teaching' and points out to the adverse effects of ad-lib teaching.

Any planning involves deciding on what one wishes to accomplish and how one wishes to go about accomplishing it. Mager (1962) strongly believes that "if you are not sure where you are going, you are liable to end up some place else --and not even know it". In teaching, deciding on what one wishes to accomplish means deciding on the objectives, i.e. what one expects the pupils to learn. The objectives are the foundations on which one builds his plan of action. They provide the basis for teachers in their decision regarding the choice of content, material,

methods and techniques which comprise their strategy for teaching the course, unit or lesson.

Generally, objectives are classified into two broad classes ; general objectives and specific objectives. General objectives are broad objectives whereas the specific objectives are narrow ones, the achievement of which will result in that of general objectives. Course-plans are usually built around general objectives, lesson plans around specific objectives and unit plans around a combination of the two. The specific objectives set for the lessons and units should be so designed that their combined impact will result in the general unit and course objectives respectively. When a general objective is listed in a lesson plan, it is understood that the same is a goal for an over-all unit or the course. Moreover, a number of lessons may be needed for the achievement of this goal.

The Genesis of the Problem

The authors had the experience of going through the student-teachers' lesson plans during their teaching hours, internship supervision and while valuing student-teachers' examination scripts. They found a number of typical mistakes committed by the student-teachers in their lesson plans. These mistakes have been examined in detail somewhere else in this paper.

The authors felt that this is a very serious phenomena which is due to the lack of proper training of the student-teachers in writing objectives in mathematics. So they undertook a systematic study of this phenomena and this paper is a by-product of this study.

A Brief Review of the Literature on Educational Objectives

In the field of education, the terms, 'aims', 'goals' and 'objectives' are frequently treated as very much synonyms. Sometimes even they are referred to under a single term 'objectives'. But many a times a distinction is made among them ; though unfortunately, no universal agreement exists among the educators as to the precise meaning of these words. So while considering these terms, it is essential to determine their inter-relationships and define their scope for the purpose of this paper.

An aim may be defined as a general statement which describes an

ideal or an aspiration towards which the educational thinking and planning are directed. Because of the visionary characteristic of an aim, it is very difficult to ascertain its realization. As such it is necessary that aims should be broken down into a number of educational activities. Generally statements which focus on the activities are called goals. Even among the goals, some of these can be accomplished earlier than the others. Sometimes goals are referred as 'general objectives'. But conventionally 'educational objective' has a set definition. An educational objective is a statement describing the post-instructional behaviour of the learners at the conclusion of a period of learning. This is the definition of instructional objective which we will take into account for our discussion in this paper.

Consider the objectives which require the students to 'know' or 'understand' at the end of the instruction. Although such objectives describe terminal behaviours, they call for a quite different type of behaviours than did the objectives that require the students 'to recall a formula', 'to solve a problem' or 'to translate from verbal form to symbolic form'. 'Knowing' and 'understanding' are types of behaviours that cannot be observed directly. Objectives with such behavioural descriptions are called 'general' or 'covert'. Behaviours such as 'recalling a formula', 'solving a problem' and 'translating from one language to another' are observable. Objectives that call for such behaviours are known as 'specific' or 'overt'.

Callahan and Clark (1977) call both general and specific objectives as behavioural objectives. But it is reasonable to call specific objectives alone as behavioural ones. For the behaviours described by the specific objectives are observable and hence measurable, whereas the general objectives are not so. Popham (1975) says that most educators tend to treat the phrases 'behavioural objectives', 'performance objectives', 'measurable objectives', and 'operational objectives' as equivalent. These above-mentioned phrases explicitly describe the students' behaviours after the instruction and consequently more or less synonyms.

Baur and George (1976) while defining objectives in terms of observable students' behaviours, used two phrases—'informational objectives' and 'instructional objectives'. According to them informational objectives are those statements which in clear terms describe what is to be accomplished as a result of instruction. When in addition to describing the students' post-instructional status, an objective also fixes a minimum level of students' performance for the acceptability of the achievement of objectives and prescribes the conditions under which students perform, it is called an 'instructional objective'. The examples

provided by them for informational and instructional objectives are respectively as follows : (a) 'the students will be able to order a set of whole numbers', and (b) 'given a sequence of 15 whole numbers with six of them missing, the student will be able to correctly name at least five of the missing numbers'.

Callahan and Clark *et. al.* call the informational and instructional objectives (as listed above) as 'simple behavioural objective' and 'criterion-referenced objective' respectively. Sometime they use the term 'instructional objective' also in the sense of Baur and George. It may be noted here that the simple objectives may be covert in nature while criterion-referenced objectives cannot be so. Because in a simple objective, specifications such as a minimum acceptable performance are not specified. So one may use such verbs as 'know' and 'understand' for stating simple objectives.

Mager (1962) advocates that all instructional objectives are criterion-referenced. But the authors are of the view that all instructional objectives cannot be written as criterion-referenced objectives. In many cases of objectives there may not be any minimum level of performance and there is only one level of expected performance. For example, in the statement 'students are able to state the associative law for the integers', there can be only one level of performance.

The origin of the objectives movement can be traced back to Herbert Spencer (1910). Thereafter Herbart (1924), Bobbitt (1918), Charters (1924), Tyler (1949), Taba (1962), Bloom (1956), Popham (1968) and Mager (1962) all extolled the use of objectives, while making contribution to their respective areas. But the kinds of objectives advocated by the educators before 1960 were not of much use in educational process. They were either too loosely stated or they were stated in terms of something other than the students' activities. Only around 1960, Bloom, Krathwohl and Mager in their writings came out with ideas on how to state educational objectives and these ideas have since been accepted by educators. Now the explicit statement of instructional objectives appears to be generally accepted in instructional and evaluative processes.

Although there are some educators who argue against the use of explicit, measurable objectives, many educators now generally feel that there are advantages of stating objectives in terms of learners' behaviours. This is because that the objectives serve as a useful stimulus to clear thinking, as a medium of communication among educators in a precise and unambiguous manner and as a guide to curriculum developers in their designing of new curriculum material. They also help teachers in planning their lessons and learners in motivating and informing them of their own learning.

Educators like Elliot Eisner (1967), Atkin (1968), Paul Hirst (1969) and Stenhouse (1970) have raised a few reservations about stating explicit objectives. Being mostly curriculum theorists, their arguments are mostly philosophical in nature and they do not see eye to eye with the arguments of teachers and evaluators. Popham (1975) after re-examining his 1967 analysis revealed that there is no change in the stand taken by the critics against behavioural objectives even after a decade. According to him "the arguments against the validity of behavioural objectives represent arguments against behaviourism, rather than reasons against using objectives. This is due to the confusion between advocacy of behavioural objectives and advocacy of behaviourism, a particular psychological approach". As one of the staunch supporters of explicit objectives he feels "that it was a serious strategic error on their part to name the objectives they advocated as behavioural objectives. As a result, the prefix 'behavioural' has now mostly been dropped in preference to 'instructional'."

Advantages and limitations of behavioural objectives have been studied in detail and listed by MacDonald-Ross (1973). It is clear that explicit objectives have both advantages and limitations. But a clear statement of objectives is more useful to teachers and evaluators than to curriculum-planners. Davies (1976) argues that questioning the use of objectives is a healthy sign, but most of the objections raised against the use of objectives also hold in case of any form of planning. The arguments in favour of objectives do not lie in the refutations of the reasons why we should not use them, but the strength of objectives lie in the help they give to curriculum planners, teachers, students and parents.

Writing Objectives in Mathematics

Generally, in all colleges of education student-teachers are trained in planning a unit and a lesson. In both these types of plan instructional objectives play a great role, for the whole planning is expected to be only with reference to these objectives.

There are certain important differences which we should bear in mind while stating objectives of a unit and those of a lesson. A unit can be broken into a number of lessons. While stating objectives for a unit, we take into consideration general and certain specific objectives with reference to the products and processes. But in a lesson plan we generally state the instructional objectives for a one-hour lesson. So it is necessary that instructional objectives of a lesson should be more pointed and

specific than those of a unit. That is, generally the covert objectives play a great role in a unit plan, whereas for a lesson plan overt objectives are more important.

Gronlund (1970) has discussed how the teacher-educators commit errors in stating the objectives and their limitations. According to him errors in stating the objectives are due to the statement of objectives in terms of (a) teacher's activity, (b) learning process, (c) subject-matter or content to be covered, and (d) multiple learning outcomes. But the authors have come across yet some other types of errors committed by teachers and student-teachers while stating the objectives under different heads: (a) instructional objectives, (b) specific objectives, and (c) behavioural objectives. The examples of such errors were selected by the authors from the lesson plans written by the teachers of colleges of education. These examples contain objectives from fields other than mathematics. These are being given here for getting a comprehensive idea of the practices regarding statement of objectives as currently prevalent:

1. To acquire the knowledge of the terms : oxidation, reduction, oxidizing agents, reducing agent.
2. (i) Knowledge of oxidation and reduction.
(ii) Understanding the modern concept of oxidation in terms of electron transfer.
3. To make the students to acquire the knowledge of respiration as an important life process.
4. (i) To make the students to acquire the knowledge of the terms : force, unbalanced force and inertia.
(ii) To enable the pupils to apply their knowledge in new situations.

We will comment on the above statements of objectives with reference to the definition of 'the objective' as given earlier.

(i) None of the above statements can be called an objective in terms of our definition, for none of these describes any terminal behaviour of the students as a result of instruction. Most of the so-called statements of objectives contain verbs which are covert in nature, viz. 'know', 'understand' and 'apply'. So these statements cannot be called specific or behavioural objectives

(ii) In the statement (a) it is not clear who is to acquire the knowledge of the terms mentioned.

(iii) The statement (b) is written in terms of the product—"Knowledge of certain concepts and understanding of certain concepts". But it is not made clear whose knowledge it is—teacher's or students'. We are not sure, whether this knowledge is a prerequisite for the lesson or the result of the instruction.

(iv) Statements (c) and (d) are written in terms of the teacher's intention instead of being in terms of students' behaviours which are the result of teaching-learning activities.

The above specimen statements are not objectives. Now we will take some samples of statements which may be called objectives and analyse them. For example :

1. Students will be able to know about the elements of the Cartesian product of two sets.
2. Students will be able to understand the Cartesian product of two sets.
3. Students will be able to define the elements of the Cartesian product of two given sets.
4. Students will be able to represent the Cartesian product of two sets in roster form.
5. Students will be able to verify the commutative law of Cartesian product in a given situation.

Now instructional objectives are broadly classified into two classes; (a) covert (general), (b) overt (specific). Both are important for planning—general instructional objectives guide in the preparation of more specific objectives. It is not proper to train the student-teachers in stating the general objectives only. The authors' experience shows that if the student-teachers are asked to state the general objectives alone, they use the verbs 'know', 'understand' and 'apply' indiscriminately without knowing what they stand for and whether these objectives can be achieved in a lesson of one-hour duration. So the student-teacher should also be trained in how to spell out a general objective in terms of specific objectives. This becomes all the more necessary because it is not sufficient to train them in how to write general objectives, but also in how they can ascertain whether these general objectives are achieved. This task of ascertaining the achievement of general objectives is done by splitting one general objective into a number of specific objectives which are written in terms of students' overt behaviours (which are measurable)

For example, one student-teacher wrote as instructional objectives of a lesson: (a) The students know about the terms 'profit and loss'. (b) The

students understand the meaning of the term 'selling price' and 'cost price'. (c) The students apply the knowledge in life situations. This student-teacher has failed to realize that in his lesson students should be able not only to know, but also should be able to understand the terms 'profit' and 'loss'. Here the objectives have not been stated in the proper sequence, as knowing 'profit and loss' implies an understanding of the terms 'selling price' and 'cost price'. Also, though one of the objectives here is that "the students apply this knowledge in life situations", not a single example of life situations was given in the main body of lesson plan. It has been the experience of the authors that many a times student-teachers state the sentence "students apply the knowledge in life situations" as an objective, though no life situation can be provided for the topic of the lesson. For example, in a lesson dealing with an axiomatic treatment of laws of indices (algebra) no life situation can be provided.

In response to a question to write a lesson plan for a period of 45 minutes on the theorem, "If a straight line is drawn from the centre of a circle to bisect a chord, it is perpendicular to the chord", students stated the following as instructional objectives: (a) the students know the properties of the circle, (b) the students know about the geometry. Both these statements are too broad and fail to qualify to be the instructional objectives for a lesson of 45 minutes.

There is a case of a student-teacher who wrote an objective as "students apply understanding in proving the theorem" instead of stating "students prove the theorem". Here the student-teacher is unnecessarily hair-splitting in stating the objective "apply understanding in proving the theorem". In another case a student-teacher stated "students understand a given theorem" as his objective. Here the student-teacher fails to notice that the students may understand the meaning of the statement of the theorem, but still they may not be able to prove the same. These are only typical examples out of many which the authors came across their study.

One significant drawback in the statement of objectives by the student-teachers was found to be that many times they stated the objectives in terms of behaviours alone without mentioning the content components on whose basis the students' behaviours are to be displayed. For example:

1. Students solve problems
2. Students judge adequacy or inadequacy of the data
3. Students identify the data in the problem

4. Students verify the results in the problem
5. Students selects an appropriate formula to find the unknown.

Product and Process Components in Objectives

Objectives in mathematics have two components process component and product component Bruner (1966) says :

We teach a subject, not to produce little living libraries from that subject, but rather to get a student to think mathematically for himself, to consider matters as a historian does, to take part in the process of knowledge getting. Knowledge is a process not a product.

What we should bear in mind is that objectives in mathematics generally refer to certain mental processes which take place in the students while learning the subject. But again, these mental processes take place while learning some mathematics content (which is called product). For example, in the statement "students apply the formula for $(a+b)^2$ in other situations", students' act of applying the formula is a mental process, and this act of applying the formula can take place with reference to other formulae as well, e.g. the formula for (a^2-b^2) . But if there is no formula under reference, the phrase 'apply the formula' becomes meaningless. So most of the objectives will have these components. Sometimes it may happen that a process objective like problem-solving skill can be achieved only in a number of lessons. Then the lessons themselves can be taken as the problem-solving skill which is a process component.

Student-teachers have been found to confuse between specific objectives of a lesson and learning outcomes given in the main body of the lesson plan. For example, in a lesson plan on Pythagoras theorem they stated under the specific objectives such phrases as "students generalize the statement of the Pythagoras theorem". Here during the classroom instruction students generalize the Pythagoras theorem by inductive method. But when the lesson is over, Pythagoras theorem becomes 'knowledge' at the recall level for the students. So it will be more appropriate to state that "students recall the statement of Pythagoras theorem" as a specific objective. In fact the generalization (of Pythagoras theorem) by students is the expected learning outcome which takes place during the instruction. Here it will not be out of place to mention that the act of generalization is a process component of the

objective which the students may achieve only after much practice in the activities leading to generalization. So the activities of generalization should be repeated by changing the product component.

It is a common practice in most of the colleges of education to write as specific objectives the expected learning outcomes corresponding to the important teaching points (concepts) of the lesson. But the authors feel that this is not desirable, for the specific objective of a lesson is defined as "behaviour or change in behaviour as a result of the instruction (after the instruction is over)". So it is not proper to state as specific objectives the students' behaviours as they are found during the instruction.

The authors' approach towards writing specific objectives appears to be more sound from another viewpoint. In the approach advocated herein there is a good 'correlation' between the specific objectives of the lesson and the evaluation items (to be given as a review after the lesson is over). For example, in the lesson cited above, the review question would be "State Pythagoras theorem", the response to which is definitely of recall level. It is to be borne in mind that as the students have already generalized the Pythagoras theorem in the class, it would not be possible for them to generalize the same after the instruction. Surely generalization will require another type of data. The advantage of the approach advocated here is that teachers or student-teachers will be in a position to measure the result of their instruction in terms of evaluation items. Here the authors would like to mention one very significant case. One student-teacher wrote the instructional objectives and teaching points in a lesson plan for Class IX as follows :

Instructional objectives :

The pupil is able to

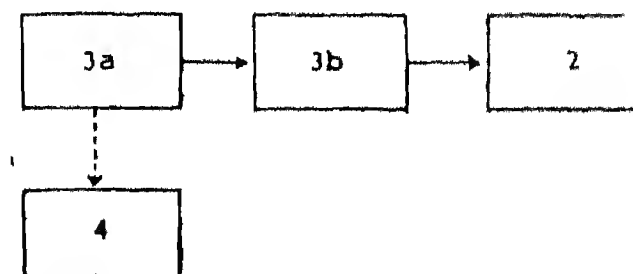
1. Calculate the area of the figure by using graph paper or geo-board,
2. prove that parallelograms on the same base between the same parallels are equal in area,
3. prove that the area of a parallelogram is the product of any side and the corresponding altitude,
4. prove that area of a triangle is half the product of any side and the corresponding altitude,
5. prove that triangles with equal areas and having any side of one equal to any side of the other have equal corresponding altitudes.

Teaching points :

1. Area of some geometric figures
2. Parallelogram on the same base and between the same parallels are equal in area
3. The area of parallelogram is the product of any side and the corresponding altitude and the area of a triangle is $\frac{1}{2}$ the product of any side and the corresponding altitude
4. Triangles with equal areas and having any side of one equal to any side of the other have equal corresponding altitudes and vice versa.

The statements of objectives and teaching points have the following drawbacks.

First each of the teaching points can be considered in a topic for a separate lesson of 45 minutes whereas the student-teacher in this case wanted to cover all the four teaching points in the same lesson. Also, the teaching point No. 3 should be separated into two sub-parts, one on the area of parallelogram and the other on the area of triangles, the concept of area of a triangle being a prerequisite for the concept of area of a parallelogram. Let us call "the concept of the area of a triangle" and "the concept of the area of a parallelogram" as teaching point Nos. 3a and 3b for our reference. Here the following schema of the teaching points is suggested :



The teaching point No. 1 appears to be out of place. The comments made herein regarding the teaching points hold also for the instructional objectives of the lesson because the instructional objectives correspond to the teaching points.

In the main body of this lesson plan it was found that the student-teacher has not written the teaching points in proper sequence. The

reason for this lapse of the student-teacher was found to be his lack of knowledge of 'schema' of the subject-matter (to use a phrase from R. Skemp) or 'task-analysis' of Gagne. An alternative approach to remedy this is to specify the expected learning outcomes in the main body of the lesson plan. For example, we may consider the following extract from the lesson plan referred herein.

Learning activities (within built evaluation)

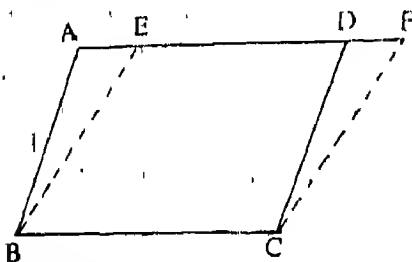
Expected pupils responses

Theorem :

Parallelograms on the same base and between the same parallels are equal in area.

Given :

Parallelograms ABCD and EBCF on the same base BC and between the same parallels BC and AD.



To prove :

$$\square^{sm}ABCD = \square^{sm}EBCF$$

Proof :

Do you say anything about $\triangle ABE$ and $\triangle DCF$?

They are equal

What is the Area of $\triangle ABE$ & $\triangle DCF$?

Area of $\triangle ABE = \text{Area of } \triangle DCF$

To both sides of $\triangle ABE$ & $\triangle DCF$ let us add the area of trapezium EBCD

Now what is the area of $\square^{sm}ABCD$?

Area of trapezium EBCD + $\triangle ABE$

What is the area of $\square^{sm}EBCF$?

Area of Trapezium EBCD + $\triangle DCF$

Which area is common in both Parallelograms ?

Area of Trapezium EBCD

And we know already that area of $\triangle ABE = \text{area of } \triangle DCF$

So what can you conclude ?

Area of $\square^{sm}ABCD = \text{Area of } \square^{sm}EBCF$

As can be seen, here the student-teacher expects the students to know (i) the equality of the area of triangles and (ii) the concept of the area of trapezium to prove the theorem. But after proving this theorem the student-teacher expects to prove the formula for the area of a triangle which is a prerequisite for the equality of the areas of two triangles. Also, generally the concept of the area of a triangle and that of a parallelogram is a prerequisite for proving the theorem, but here in this extract the concept of a trapezium is a prerequisite for proving the theorem. This mistake could have been avoided by the student if he would have mentioned the expected learning outcome for each learning activity. For example, by introducing an activity, the response to which is students' recognizing the equality of the areas of two triangles ABE and DCF, the student-teacher could have sensed his mistake that what he plans to teach later should be a prerequisite.

Many a times the student-teachers find difficulty in writing a lesson plan wherein the specific objective is of higher category, e.g., "students are able to prove a theorem (solve a problem)". The difficulty is caused by that more than the sequencing or the plurality of the learning activities this type of objective points out to the inter-relationship of different learning activities and student-teachers fail to notice this inter-relationship. If the student-teacher gives only a series of learning activities to achieve this type of objective, students will easily perform these activities during the instruction. But still they may fail to perceive the relational aspect of the activities. Consequently the students fail to achieve the instructional objective, though they behave during the instruction as expected.

When a student-teacher provides directed learning activities, they only lead to the knowledge of the proof of the theorem instead of providing a method. Here the main purpose of providing learning activities is to achieve the above-mentioned objective to develop in the students a technique to approach the proof of theorems, and the knowledge of such proof of a theorem is only a secondary consideration. For, students can recall the proof of the theorem even without the student-teachers providing learning activities.

As a remedy, if the student-teacher attempts to specify the type of learning outcomes expected as a result of his learning activities, he is likely to know the effectiveness of such activities. For he can know the amount of students' participation and their mental processes.

Another alternative approach is that the students should be given full opportunity to behave independently (without much of prompting) as far as possible. The student-teacher should come to help the students,

only when he finds that his help is necessary. His help and prompting should be gradual instead of stating the activities in such a way that students do not have to think much.

Student-teachers have been found to write multiple objectives mentioning more than one learning outcome in the same statement. For example, "students know Pythagoras theorem and apply it in solving verbal problems". The difficulty with such statements is that they are not completely measurable in many cases. For example, in the cited illustration, students may be knowing Pythagoras theorem but may be unable to apply the same in verbal problems. Consequently, it is difficult to decide, whether the objective has been completely achieved.

An Alternative Approach

In the light of the above discussion on the ways and practices of writing objectives in mathematics, the authors in the following lines suggest an alternative approach to the statement of objectives in a mathematics lesson plan.

Any syllabus starts with the 'broad' objectives of teaching mathematics. But a teacher does not have the privilege to tamper with them, because these general objectives are the products of the states' philosophy. Also the syllabus of a course in India is generally decided by the higher-ups and the teachers have little or practically no say in it. So this paper will discuss how the student-teachers are to be trained in writing objectives in unit planning and lesson planning.

Generally when the syllabus of a branch of mathematics is given, it is divided into units. The objectives of the unit should be directed towards the broad objectives of teaching mathematics. Keeping these objectives of the unit in view, the unit should be sequenced into a number of suitable lessons. The sequencing may differ according to the change in the objectives of the unit. After the unit has been divided into a number of lessons, student-teachers should be asked to write the detailed lesson plan for each lesson. In each lesson the specific objectives of the lesson should be mentioned, keeping in view the prerequisites of the lesson, where the sequencing of the unit plays a great role. After this, the student-teachers should be asked to write the learning activities and the corresponding expected learning outcomes (in overt behaviours of the students).

The student-teachers should be trained in writing specific learning

outcomes in terms of overt behaviours of the students. By doing this the student-teachers are able to know what are the levels of the learning activities and whether during the instruction students are progressing towards the instructional objectives.

As is quite clear, for the same instructional objectives we may have different learning strategies. These learning strategies are known by the corresponding learning activities whose responses are to be measured in terms of expected learning outcomes, whose measurement can be achieved only by their specifications. The specifications of the learning outcomes also help in deciding which of the strategies for achieving an instructional objective is more desirable.

This sort of practice trains the student-teachers in framing the right type of learning activities, given the expected learning outcome. This is very important, because the suitability of a teaching strategy is determined mostly by the learning activities. Also by this practice the student-teachers become aware of how formative evaluation is an important part of a lesson plan, and teaching and evaluation are but two sides of the same coin.

At the end of a lesson plan, the student-teachers should be asked to write evaluation items to test whether the students' behaviours correspond with the specific objectives of the lesson.

The unit test should reflect the specific objectives of the unit. Ordinarily, a unit test can be constructed by a student-teacher selecting evaluation items which he might have prepared for the lesson of the unit. But sometimes there may be a general objective of a unit, which cannot be achieved in any one of the lessons of the unit, but may be a cumulative effect of all the lessons of the unit. Corresponding to such general objective, the student-teacher may have to frame fresh evaluation item independent of all the lessons.

Here it is to be emphasized that student-teachers should be trained not only in stating general objectives, but also in how to split it in terms of specific objectives. General objectives of their own are not measurable. They are measurable only in terms of specific objectives. Similarly specification of expected learning outcomes helps in measuring the suitability (and hierarchy) of the learning outcomes and thus in a way, the measurability of the general objectives. Care should be taken that student-teachers do not write multiple objectives.

The Training Programme

The authors undertook a programme of training a class of 38

student-teachers in writing the objectives in a mathematics lesson plan as suggested in the previous section. To start with, the authors in their theory classes on "methodology of teaching mathematics" made emphatically clear the need for planning lessons. Then the authors followed this by stressing the relationship between objectives in a mathematics lesson and the taxonomy of educational objectives as given by Bloom.

Each student-teacher was assigned a topic for a lesson for content analysis. Then after the content analysis of the topic he was asked to write the general objectives of the lesson. After this student-teachers were given practice in writing teachers' activities. Each of them was asked to give mock microteaching lesson to their peers (class-fellows). At times some student-teachers in giving the lessons felt it difficult to accept or reject the responses given by their peers. Other situations arose when the student-teachers felt difficulty in structuring a definition or in stating a theorem properly or in getting generalization of certain mathematical facts with the help of peers' responses. These problem situations motivated the student-teachers to write in advance the expected students' responses and made them understand the importance of and the need for the different components of the mathematics lesson plan. So accordingly, student-teachers were advised to write the expected students' responses based on the teachers' activities for their respective topics.

At times situations arose wherein student-teachers wrote the teachers' activities not in accordance with the general objectives such as "students will be able to think logically" or "students will be able to prove a certain theorem". For they imagined the students' responses beforehand and constructed such activities that students' responses were mostly parrot-like and automatic without much scope for the mental participation of the students. On the face of it, student-teachers appeared to do a wonderful job. But really the students in the classes were doing like actors who repeat their words without much thought after having the promptors' suggestions.

At this stage student-teachers were given practice in construction of evaluation items and were advised to construct evaluation items to measure the outcomes of their respective learning activities. Then they were asked to ascertain whether their respective evaluation items measure the general objectives of their respective lessons. It became difficult for the student-teachers to do this, as general objectives are mostly written in covert terms. So they felt the need for breaking the general objectives in terms of specific and overt objectives. Accordingly they were given training in this.

This limitation of stating general objectives alone was brought to the notice of student-teachers by the authors and they were made aware of the ineffectiveness of their whole exercise. They were also explained the importance of and the necessity for writing the expected learning outcomes in terms of overt behaviours.

The authors feel that at this stage the student-teachers should be introduced to the different approaches and techniques of teaching mathematics so that they are able to structure their learning activities properly towards the attainment of general objectives. Because different techniques of teaching are to be followed for the achievement of different objectives of the same topic.

Now it can be clearly seen that the preliminary section of any lesson plan has four important components: (a) teaching points (concepts), (b) general objectives, (c) specific objectives, and (d) previous knowledge. In the main body of the lesson plan there are learning activities (teachers' activities and students' activities including expected students' responses) and expected learning outcomes. In the end, the lesson plan contains review and evaluation items (including possible assignments). By the end of the training student-teachers were made to realize the inter-connections among the different components of a lesson plan.

Evaluation of the Training Programme

The evaluation of this training programme was based on the following data :

1. Answers of all the student-teachers to the following compulsory question set in the semester examination were analysed by the authors: "List five specific objectives you would bear in mind while teaching the topic 'compound interest' for Class XI' (see Appendix I for the objectives pooled from the student-teachers' answer-scripts).
2. One of the authors gave an introductory lesson on 'Linear programming' to the student-teachers in a mock microteaching session. After the lesson, they were asked to state the objectives of the lesson and a discussion on the lesson followed (see Appendix II for the objectives given by most of the student-teachers).
3. The authors' discussion sessions with the student-teachers before and after the student-teachers' lessons in mock microteaching sessions and during internship (practice teaching).

Conclusions and Recommendations

The authors felt that on the whole their attempt to train the student-teachers in writing the objectives in mathematics (at different stages) have been successful, when it is considered from the point of view that during the training programme the main focus has been on the writing of specific objectives. This becomes clear from the appendices.

During the training programme the student-teachers were studying two method subjects, one of them being mathematics. So 10 per cent of the student-teachers who were low achievers could not understand the full implications of the training programme and they used to confuse between the procedures followed in the two methods subjects regarding the statement of objectives. But the personal discussion of the authors with the student-teachers revealed that they were generally appreciative of the ways of writing objectives in mathematics as proposed in this paper and the interconnections of the different components of a mathematics lesson plan.

The authors feel that the training programme would have been more effective, had the student-teachers been exposed to Gagne's concept of 'task analysis' and Skemp's idea of 'schematic learning', because then the student-teachers would have visualized the relation of the objectives of a lesson to those of a unit. But the time at the authors' disposal was not sufficient for introducing these ideas to the student-teachers. They are considering to follow up this study keeping in view that an introduction of the ideas of Gagne and Skemp to the student-teachers would be useful.

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APPENDIX I

Students will be able to

1. recall the formula to find the compound interest.
2. recognize the formula to find the compound interest from a set of formulae.
3. recall the procedure in deriving the formula to find the compound interest.
4. explain the concept 'compound interest' in their own words.
5. select the appropriate formula to find the compound interest under different problem situations.
6. estimate/calculate/find the compound interest in a given problem.
7. verbalize/translate the formula for compound interest from symbolic form.
8. substitute the values of principal, rate and number of years (time) in a given problem in the formula for compound interest.
9. judge the adequacy or inadequacy of the given data in a problem on compound interest.
10. detect errors in the calculation of compound interest.
11. express a variable in terms of other variable in the formula for compound interest.
12. verify the results obtained on using the formula directly and doing the problem in stages.
13. identify the known and the unknown in a given problem situation.
14. illustrate the terms of compound interest with examples.

APPENDIX II

The students will be able to

1. define the phrases: (a) objective function, (b) linear constraints, and (c) linear programming.
2. explain the phrases: (a) objective function, (b) linear constraints, and (c) linear programming.
3. give examples for (a) objective function, and (b) linear constraints.
4. represent in mathematical language the objective function and the linear constraints of a given real-life situational problem.
5. construct a real-life situational problem, given the objective function and the linear constraints. [1]

Creativity, Intelligence and Socio-economic Status

An Interactional Study

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THE FACT that the past two decades have witnessed a considerable increase in research efforts on creativity of its different aspects have been highlighted by several reviewers (Raina 1971, Gupta 1974, Mansfield, Busse and Krepelka 1978). At the same time, it has been realized that despite these efforts, there remains much to be done to arrive at a consensus regarding the nature and nurture of creativity (Gupta 1977). In the words of Freeman, Butcher and Christie (1971) who were one of the first to summarize the field :

The concept of creativity as commonly employed is amorphous and indefinite; its relationship with longer established concepts in education and psychology is vague and loose and its use by both educators and psychologists highly individualistic. Current views on the nature of creativity differ widely and cannot easily be separated from intelligence and intelligence testing, the assessment of special aptitudes and abilities, learning theory, personality theory and psychology of thinking. There is yet no unified psychological theory of creativity available to the research worker or the educational practitioner.

*The present study forms a part of a larger study entitled 'A study of institutional climate and behaviour in relation to creativity and classroom teaching' completed by the authors for the Indian Council of Social Science Research. The views expressed in the paper, however, are of the authors and do not convey the policy or opinion of the Council.

Results

(A) Verbal Creativity

Table 2 gives the summary of the analysis of variance of 3×3 factorial design when creativity was taken in terms of scores on verbal creativity.

TABLE 2
SUMMARY OF THE ANALYSIS OF VARIANCE FOR VERBAL CREATIVITY

S.No.	Source of Variance	Sum of Squares	Df	Mean Variance	F-ratio
1.	A. Intelligence	1169.62	2	584.81	.3632
2.	B. Socio-economic status	3301.32	2	1650.69	11.0251
3.	A \times B Interaction	1151.23	4	287.81	.1787
4.	Within sets	202879.76	126	1610.15	

It may be observed from Table 2 that none of the F-ratios is significant. Thus, it can be said that verbal creativity as measured by the MIK test of creativity is independent of socio-economic status, intelligence and their interacting influence respectively.

(B) Non-Verbal Creativity

Table 3 shows the summary of analysis of variance when creativity was taken in terms of scores on non-verbal creativity.

TABLE 3
SUMMARY OF ANALYSIS OF VARIANCE (3×3) FOR NON-VERBAL CREATIVITY

S.No.	Source of Variance	Sum of Squares	Df	Mean Variance	F-ratio
1.	A. Intelligence	154.85	2	77.245	.1410
2.	B. Socio-economic status	217.38	2	108.69	.1980
3.	A \times B	252.04	4	63.01	.1148
4.	Within sets	69157.07	126	548.865	

It may be seen from Table 3 that all the F-ratios (main effects and interaction) are insignificant. This indicates that non-verbal creativity as measured with the help of MIER tests of creativity is independent of socio-economic status and intelligence together with their interacting influence.

Discussion

From the above conclusions it is implied that creativity, whether verbal or non-verbal, does not depend upon intelligence and socio-economic status. It is also free from their interacting influence. Therefore, the teachers and educational authorities, who are used to restricting their attention towards pupils with high intelligence and socio-economic groups, need to be sounded that even pupils with lower intelligence and socio-economic status may also be creative. It becomes all the more important, therefore, to identify the creative children during their early years. The latest figures of the Union Education Ministry show that out of 100 children who enter the educational system, only 20 reach Class X. In other words, 80 per cent of our most precious resources, our children (and many of them are obviously creative!) are lost to the society for ever. The implications of this wastage for the future development and progress of a developing nation like India need not be under-estimated.

Lastly, the results give a very convincing evidence of the construct validity of the verbal and non-verbal batteries of MIER tests of creativity. Creativity (verbal and non-verbal) as measured by these newly developed tests has been found to be independent of both single and interacting influences of intelligence and socio-economic status. It is hoped that prospective Indian researchers shall make an increasing use of these indigenous batteries in creativity studies.

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Teacher Behaviour and Student Characteristics

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Teachers' behaviour tends to create quite different psychological environments for different students within the same classroom. A cross-section of this behaviour is the ways teachers dispense praise and reproof among their students. This paper attempts to identify, with the help of a scale developed earlier, students who receive praise and to those who are reproofed and determine some of the psychological characteristics of such students. That a few students receive most of the praise showered by teachers and a few receive most of the reproof and that the students living in a praise-dominated environment and those living in a predominantly reproof-ridden atmosphere show significant differences in certain characteristics are the results, yielded by this study. Whereas these results may raise many eyebrows among teachers, that teachers might well examine their own behaviour is inevitably warranted.

STUDENTS work up to their ability in one school but not in another. A student is more effective, with respect to one set of goals or another, in one school setting versus another. A great deal, of course, depends on the interaction of learner, task, method and teacher variables. But the explanation of such differences, in fact, is to be found in the different psychological atmospheres that characterize the several educational environments. Psychological dimensions of educational environments have been examined by different researchers. Pace and Stern (1958) probe the general milieu provided by an educational setting. They, illustrating a number of efforts made to measure college environments in terms of their potential for satisfying the psychological needs of different types of students, find vast differences among colleges and

within colleges. Gnagey (1960), dealing with another dimension, that of the power structure within a class group, demonstrates its effect on teacher disciplinary action outcomes as well as upon learning. Medley and Mitzel (1958), investigating some general dimensions of classroom environments imposed by teachers and measurable by observational techniques, identified three important dimensions, i.e. emotional climate, verbal emphasis, and social structure. deGroat and Thompson (1949) illustrate that cold and hostile environment or warm and friendly environment, that the teachers might create, may lead to make a child less or more nature, knowledgeable and adjustive.

The environment, more precisely the social-incentive climates, that teachers create while distributing praise and reproof among their pupils, has been explored in the present study. This dimension of environment is built up by such behaviour of the teacher as is shown while commending or blaming a student. Firstly, this environment has been measured by spotting out children living under more or less clear-cut patterns of teacher praise and reproof. Prior to it, a scale for the purpose had been constructed and pretested. Secondly, an attempt has been made to determine some of the psychological characteristics of children living under the two different climates.

Any relationship that may exist between patterns of teacher praise-reproof and the psychological characteristics of students cannot be considered as a cause-effect paradigm. Thus the question as to whether students have developed certain characteristics partially or wholly as a result of teacher praise-reproof, or whether teachers show different evaluative attitudes toward students already having particular psychological characteristics has been left unanswered. This interesting problem may be unravelled by future researches involving a longitudinal approach.

Hypotheses

This experimental study was designed to test the following hypotheses: (i) Bright students receive more praise than reproof, whereas dull children receive more reproof than praise, from their teachers. (ii) High achievers receive more praise than reproof, whereas low achievers receive more reproof than praise. (iii) Those who show greater personality adjustment are more self-adjusted and more socially adjusted, receive more praise than reproof and those who show poor adjustment in the said aspects receive more reproof than praise. (iv) Those who receive little, if any, praise or reproof, may be unsocial and withdrawn.

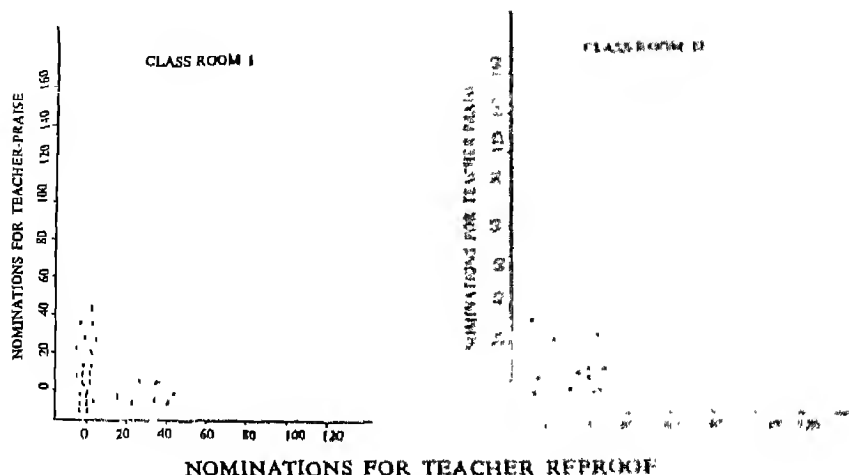
Construction and Pretesting of Teacher Praise and Reproof Scales

The author sampled a fairly large number of commonly occurring situations in which children are commended or blamed by teachers for different types of behaviour. He selected those on the basis of controlled observation of teacher-child interactions in nine classrooms (one each of Class V, VI and VII in each of the three urban schools that are 30 years old, well-established, known for their fairly high educational standard and manned by well-qualified and experienced teachers). "The child who is praised by the teacher for doing his/her homework regularly," and "the child who is rebuked by the teacher for being inattentive in class" are the two examples of the behaviour descriptions (first for teacher praise and the second for teacher reproof) thus chosen. Students were to nominate classmates for praise or reproof situations. Of the 46 behaviour descriptions originally collected (25 for teacher praise and 21 for teacher reproof), only 20 (ten each for teacher praise and teacher reproof) were finally retained, because the rest of the descriptions could not withstand the shock of a try-out test, that was administered to 30 Class VII students, as they were found either vague or liable to be responded to on the basis of a general 'halo' effect. The behaviour descriptions finally selected constituted the author's teacher praise and reproof scales. These behaviour descriptions, it is considered, are fairly representative of the types of situations in which students typically receive praise or reproof from their teachers.

Procedure

The teacher praise and reproof scales were administered, on two different occasions separated by a four-week interval, to two classrooms of Class VII in a suburban school (a 25 years old school of recognized standing in the state's educational set-up). The data obtained from the first administration of the scales are presented graphically on page 74. These data show a very small number of students receiving a high percentage of teacher praise nominations, a few receiving most of the teacher reproof nominations, and the majority receiving few, if any, nominations for either teacher praise or reproof.

The stability of student rankings on teacher praise and reproof over the four-week interval is shown in Table 1. The consistency of the teacher reproof scales seems to exceed that of the teacher praise-scale.



The rank-order correlation coefficients indicate a fairly high amount of pupil consistency in nominating their classmates to fit teacher praise and reproof descriptions. Again, these correlation coefficients are fairly high for tests separated by a four-week interval, since it is likely that some real changes in rank, which the so-called 'perfect' measuring instrument may reveal, occurred during the four-week interval.

TABLE 1
RANK-ORDER CORRELATION COEFFICIENTS BETWEEN TEST-RETEST*
SCORES ON TEACHER PRAISE AND REPROOF SCALES

Class**	Number of Students	The Scale	
		Praise	Reproof
I	52	.74	.85
II	45	.78	.82

*Test and retest occasions were separated by a four-week interval

**Both were Class VII of an urban school

Some of the psychological characteristics of students experiencing the following patterns of teacher praise-reproof were then studied :

1. Pupils in the upper quartile of teacher praise nominations and falling at or below the median of reproof nominations, i.e. high praise-low reproof group (HP-LR).

2. Pupils in the upper quartile of teacher praise nominations and falling above the median of reproof nominations, i.e. high praise-moderate reproof group (HP-MR).
3. Pupils falling at or below the median of both teacher praise and reproof nominations, i.e. low praise-low reproof group (LP-LR).
4. Pupils in the upper quartile of teacher reproof nominations and falling above the median of praise nominations, i.e. high reproof-moderate praise group (HR-MP).
5. Pupils in the upper quartile of teacher reproof nominations falling at or below the median of praise nominations, i.e. high reproof-low praise group (HR-LP).

These patterns of teacher praise-reproof may serve as adjoining areas in a two-dimensional plane of teacher praise-reproof, so that these five patterns constitute a two-dimensional 'area-continuum'. An individual student's scores on both teacher praise and reproof would determine his inclusion in one of the five patterns. As the above procedure is merely an approximation adopted for experimental analysis, a number of students may not be included in any of the five patterns.

The psychological characteristics to be studied were academic achievement, intelligence, and personality adjustment of students falling under fairly clear-cut categories of teacher praise and teacher reproof. Three classrooms of Class VII in an educationally meritorious school situated in an urban area were chosen for this phase of the study. The tests administered to the 154 pupils in these classrooms were : (i) Teacher-made objective type tests in the subjects of English, mathematics, science and social studies, each test carrying 100 marks. A student's aggregate marks in the four subjects formed his academic achievement. (ii) Lorge-Thorndike intelligence test level 4, Form A-nonverbal (1959) to determine IQ which was termed as intelligence level, (iii) Colifornia test of personality (1953) to get personality adjustment scores. The means and standard deviations of the scores of all the tests for each of the five praise-reproof groups are presented in Table 2. The data were analysed by Fisher's t-test which yielded the results discussed below.

TABLE 2

MEAN AND SD'S OF ACADEMIC PERFORMANCE, MENTAL
MATURITY AND PERSONALITY SCORES OF THE FIVE
TEACHER PRAISE-REPROOF GROUPS

		<i>Patterns of Teacher Praise-Reproof</i>				
		<i>HP-LR</i>	<i>HP-MR</i>	<i>LP-LR</i>	<i>HR-MP</i>	<i>HR-LP</i>
Academic performance	M	194.48	200.45	165.35	167.48	154.82
	SD	17.32	15.36	18.62	17.56	32.21
Intelligence level	M	95.84	103.92	84.15	85.65	78.72
	SD	13.91	10.42	12.02	10.92	16.03
Total personality	M	122.05	133.82	114.82	102.02	105.72
	SD	13.92	12.84	19.95	15.75	16.96
Personality 'self-score'	M	49.72	57.95	46.65	42.74	44.86
	SD	7.85	7.62	9.96	8.16	7.73
Personality 'social score'	M	64.02	59.75	52.82	45.55	48.64
	SD	3.46	3.34	6.72	6.02	8.95

Results

1. In academic achievement the HP-LR group scores significantly higher than the HR-MP or the HR-LP group. The HP-MR group obtains a mean score significantly higher than the LP-LR and the HR-MP groups. This indicates that the children having more subject knowledge receive greater teacher approval, at least as judged by their classmates. This verifies hypothesis 1.

2. In intelligence the HP-LR group is significantly higher than the HR-MP or the HR-LP group, while the HP-MR scores significantly higher than the LP-LR and HR-MP groups. This supports hypothesis 2 that the more intelligent students in a typical classroom receive a significantly larger amount of teacher praise, as seen by their classmates, while the less intelligent pupils receive large amounts of teacher reproof.

3. The means of the total scores on personality follow a similar trend. The HP-LR is significantly better adjusted than the HR-MP or the HR-LP group, while the HP-MR group shows superior adjustment to the HR-MP and the HR-LP groups. As total score on California test of personality

represents the pupil's 'adjustment' as he sees it, the result that those who are better adjusted receive great teacher praise implies that the traditional teacher has a great deal of knowledge of, or is significantly influenced by, the student's valuation of his own adjustment, which appears to be unlikely, unless the student's valuation of his adjustment is true enough to be so manifest that the teacher has long known it, which seems to be the most probable explanation of the total score in the present study. The direction and nature of cause-effect relationship, if any, between personality adjustment and teacher praise-reproof is uncalled for in this limited study. A departmental study, longitudinal in design, may throw some light on whether pupils who are given large doses of praise by teachers or who are living in a predominantly teacher-praise atmosphere become more 'well-adjusted', while pupils who are reproofed by teachers day in and day out or who are living in a predominantly reproof-ridden environment become progressively more 'poor-adjusted'.

4. The mean self-scores which form part of the total scores may be interpreted in a similar way. The HP-LR group is superior in self-adjustment to the HR-LP and HR-MP groups, while the HP-MR is significantly more self-adjusted than the LP-LR and HR-LP groups. The HP-MR group, besides, shows significantly better self-adjustment than any of the other four groups. But it is intriguing to find that the group (HP-MR), which is highly praised but which also receives a moderate dose of reproof from teachers, shows significantly better 'self-adjustment' than the group (HP-LR) which receives high praise and little reproof. A guess that may be hazarded is that pupils who receive large amounts of praise and no reproof may be operating under such intense pressure to conform to social demands as to be handicapped in areas of 'self-adjustment'. This is a provocative hypothesis that the present data do not support as is evident in the fact that the HP-LR group has a higher mean score in social adjustment than the HP-MR group (result No. 5 below). Future studies need to examine this hypothesis more critically. It may, however, be concluded with a high degree of confidence that students who receive high amount of teacher praise show better 'self-adjustment' than those who face excessive teacher reproof.

5. Means of social scores decline regularly with progression from the teacher praise to the teacher reproof end of the 'continuum', which shows that the greater the social adjustment the greater the teacher praise and the lesser the social adjustment lesser the teacher praise. This interpretation, however, is somewhat difficult to accept because of the apparent lack of homogeneity of variance among the five praise-reproof groups. Had the groups shown homogeneous

variability, the obtained *t*'s could be interpreted as showing that the groups which receive greater teacher praise show superior 'social adjustment'. The high-praise groups, on the other hand, have higher mean scores in 'social adjustment', but significantly less variability in 'social adjustment' scores. Thus the third hypothesis that those who receive more praise than reproof are better adjusted, at least so far as they see it, are more self-adjusted and more socially adjusted also stands verified. Again, low mean score of LA-LD group supports the fourth hypothesis that those who receive, little, if any, praise or reproof, may be withdrawn and unsocial.

The study illustrates that being bright, high achieving, or more well-adjusted brings forth or creates a fund of admiration for and retards the flow of reprimand to a student, but the possibility that praise brings forth or creates brightness, high achievement, and greater personality adjustment—both self and social—cannot be ruled out. This possibility may be explored by future researches involving stricter controls and protracted over long periods of time so that on the one hand, the graduated development of the said characteristics and, on the other, retardation in the development of these, as caused by experimental doses of praise and of reproof, respectively, can be delineated.

The findings reported in this paper demonstrate that many 'unseen' or 'unperceived' but psychologically significant variables like praise and reproof may be operating in the educational context in which teachers instruct. These variables may accelerate or hinder the teacher's endeavours, depending upon a variety of complex interactions among students, teachers, and environment. Awareness that such dimensions of educational environment exist may help the teacher to forestall problems or to use these dimensions to instructional advantage. Awareness that some of the significant classroom dimensions are a direct product of the teacher's own behaviour (as personality maladjustment of a pupil may be the doing of a nagging teacher and a high achievement of a child that of an optimistic and encouraging teacher) may make him more sensitive to the ramifications of what he does in the classroom, and may even stimulate him to make constructive modifications in his behaviour.

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Ph.D. Theses Abstracts

A Comparative Study of the Relative Effectiveness of Four Methods of Teaching Literacy to Adults

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THE DEBATE on the controversial issue of the relative efficiency of the different methods of imparting literacy to adults assumed importance ever since several developing countries started the literacy programmes on a large scale as national programmes of priority. The method of teaching literacy is considered to be an important and critical factor because it influences the pace of learning and the pace of learning is a very important aspect of adult learning. The choice of method has become consequential because of the competing claims of different methods about their appropriateness and effectiveness. The list of competing methods has increased in the recent times because of efforts made to modify and innovate on the traditional methods of teaching literacy to children to be applicable to adults. Each method has its own distinctive advantages and it is to be tried to integrate the methods with distinctive advantages if they are not incongruous. This is an open approach and calls for its own procedure. This study primarily aimed at this task.

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The methods can be classified into two broad categories, viz. alphabetic method and sentence method. The other methods are variations of these two methods. The alphabetic method is considered as a traditional method since it is the old method in practice. The sentence method is relatively a new method which staked claims of its superiority over the alphabetic method. In recent times the added dimension to the methods is the sequential order of the emphasis on reading and writing. It is claimed that it is more efficacious to teach reading first without insistence on writing mastery to start with and then paying attention to the writing aspect. The other method is insisting on reading and writing skills at the same time. Thus, with this dimension added, there could be four distinct methods of teaching literacy :

1. Sentence method with reading and writing skills insisted simultaneously.
2. Alphabetic method with reading and writing skills insisted simultaneously.
3. Sentence method with reading skills followed by writing skills.
4. Alphabetic method with reading skills followed by writing skills.

This Study

This study through experimental design tried to measure the relative effectiveness of the above-mentioned four alternative methods. Besides measuring the differences between these four methods, a control group consisting of the school children who passed out Class III of schooling was selected to compare the performance of these methods so that an absolute criterion is also used besides relative criterion in assessing the effectiveness of the experimental methods. The study was conducted in the rural villages of Telangana region of Andhra Pradesh. Necessary care was taken to see that the four experimental groups matched in all respects except in the variation of method of teaching literacy. The relative efficiency of these methods are judged on the basis of mean scores and standard deviations on the three tests namely, reading test, writing test and arithmetic test at the end of four months.

Hypotheses

For the purpose of the present study, the following null-hypotheses were formulated:

1. There will not be any significant difference in adult literacy learning when literacy is imparted through sentence method with reading, writing simultaneously *or* reading followed by writing.
2. There will not be any significant difference in adult literacy learning when literacy is imparted through alphabetic method with reading, writing simultaneously *or* with reading followed by writing.
3. There will not be any significant difference in adult literacy learning when literacy is imparted through sentence method with reading, writing simultaneously *or* alphabetic method with reading, writing simultaneously.
4. There will not be any significant difference in adult literacy learning when literacy is imparted through sentence method with reading followed by writing *or* alphabetic method with reading followed by writing.

Sample

A sample of 120 illiterate adult learners was drawn from the universe of rural illiterate adult learners. This sample was divided into four groups of 30 each in such a way that those groups were homogeneous in age, general comprehension, socio-economic background and levels of motivation to acquire literacy. The four experimental groups will hereafter be referred to as G_1 for group one, G_2 for group two, G_3 for group three and G_4 for group four and the control group consisting of Class III as G_5 being the fifth group.

Method and Analysis

The four experimental groups, namely, G_1 , G_2 , G_3 and G_4 consisting of 30 illiterate adults each were exposed to different methods of imparting literacy. G_1 was exposed to literacy instruction through sentence method with reading and writing done simultaneously for four months. G_2 was also exposed to literacy instruction through sentence method with reading for the first two months followed by writing for four months. G_3 was also exposed to literacy instruction through alphabetic method with reading and writing simultaneously for four months. G_4 was also exposed to literacy instruction through alphabetic method with reading for the first two months followed by writing during the next two months. G_5 consisting of the school children of Class III on completion at the end

of the third year of schooling was also exposed to the same literacy tests along with the four experimental groups, for assessing the effectiveness of the method in relation to the attainments of regular schooling in conventional school system.

The reading test administered to all the five groups comprised four items intended to test the ability to recognize and read letters and words, reading simple sentences of a given passage and reading comprehension respectively. The third item of the test on reading comprising a passage with simple sentence relates to the daily life situations and experiences of the learners of all the groups. This was sought to measure the efficacy of the method followed in teaching reading skills. It was proved that the method followed in teaching G_4 is more effective than the other methods followed for other groups. The factors such as the place, age, management, literacy materials and the socio-economic conditions remaining the same, the method followed in imparting literacy skills influences the learning process a great deal.

Another test-item devised to measure the reading and comprehension simultaneously was based on a passage comprising sentence- related to the daily life of a peasant. The questions set at the end of the passage are intended to test the comprehension of the learner. When this test was administered on the learners, the performance of G_4 was found to be qualitatively and quantitatively superior to that of other groups. Hence, it may be inferred that the method adopted in the case of teaching the group G_4 influenced the learning of literacy skills. All the sub-units on reading test and reading comprehension establish the fact that the method employed in teaching literacy skills plays a dominant role in learning.

The writing test administered to the learners comprised five items intended to test the ability to recognize and write alphabets and words, writing one-word answers, writing names and writing simple sentences dictated. An analysis of the results of this test showed that the group G_4 fared better in acquiring writing skills also better than the other groups. This corroborates the view that method plays a prominent role in the acquisition of literacy skills. It may also be inferred that acquiring ability to write secondary forms and conjuncts is a common difficulty among all the learners. But even this difficulty is surmounted by G_4 . This can be doubtlessly attributed to the efficiency of the method adopted to teach the learners of G_4 . Other conditions remaining the same, the method to which a particular group is exposed, determines the quality and quantity of learning literacy skills. In addition to the method adopted, the frequency of a particular alphabet, word or sentence influences the acquisition of literacy skills.

Arithmetic was taught to all the groups using traditional method followed in schools. No special method was adopted to any of the experimental groups from G_1 to G_4 . There was no significant difference between these four groups in the performance of arithmetic test. This again may indicate that the relatively higher performance of G_1 in reading and writing tests is due to the effectiveness of the method.

The analysis of the results illustrate that the alphabetic method with reading for the first two months followed by writing for another two months proved superior than all other methods. The achievement level of G_1 had been far superior than the other groups including the group G_4 which has had three years' regular schooling in the conventional school system.

In addition to the method, the letters with low frequency of occurrence were not learnt easily in comparison with the letters with high frequency of occurrence. The letters and letter combinations including words and sentences with secondary forms and conjuncts, the similar and dissimilar forms of consonants also were included in the test items but the results revealed that the letters, words and sentences without secondary forms or with less secondary forms or without conjuncts were learnt more easily than the letter forms and word combinations with similar, dissimilar forms and conjuncts. It is interesting to note that the findings of this investigation were in line with the findings of Lamport (1935), Gray (1956), Judd (1918), Huey (1912), Neijls (1954), Anderson and Dearborn (1952), Seegers (1948), Decorly (1927), Wallis and Gates (1948) in so far as the alphabetic method is concerned.

Conclusions

The following conclusions were drawn from the present study :

1. Alphabetic method is better than sentence method.
2. Alphabetic method is best suited for teaching adults than the sentence method.
3. Within the alphabetic method, teaching-reading for the first two months followed by writing is more effective than the conventional alphabetic method with reading and writing done simultaneously.
4. Reading ability precedes the other literacy skills.
5. The learning process becomes easy if the number of letters are as less as possible.

6. The primary forms of vowels and consonants are learnt more easily than the letters with secondary forms and conjuncts.
7. The adults can acquire the needed functional literacy skills of the standard of Class III plus in about four months.



*A Study of the Scheduled Castes' Awareness about
the Schemes for their Educational Progress*

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ACCORDING to 1971 census, the population of scheduled castes was 8.25 crores forming 15.04 per cent of the total population of the country. The large chunk of population has remained backward and illiterate since ages due to historical and various socio-economic reasons. A variety of efforts were made to improve the conditions of the scheduled castes. The national five year plans have also allocated separate funds for the amelioration of their lot. The Central Government and most of the state governments have planned meaningful programmes and provided schemes like ancillary services, pre-matric and post-matric scholarships, technical education, overseas scholarships, hostels, residential schools, reservation in Sainik schools, IIT, IIR, and other educational institutions, etc. for the educational uplift of the scheduled castes since it is felt that education will improve their socio-economic lot.

Despite such efforts the educational progress of the scheduled castes is far from satisfactory. This slow progress in the education of scheduled castes as reflected in low enrolment ratio and literacy rate raises several pertinent questions about the educational schemes. Are the scheduled

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castes aware of the facilities provided by the government under different schemes? If not, why? If yes, are they utilizing these facilities properly? If they are not utilizing the facilities properly, is there something wrong with the schemes themselves or are they precluded by some other reasons? What can be done to improve the functional effectiveness of the schemes? An objective assessment of the existing position based on scientifically collected data are essential for securing answers to the questions posed above. The present study is an attempt to provide answers to these questions.

Objectives

The specific objectives of the study can be stated as under :

1. To identify the educational schemes for facilitating education of the children belonging to the scheduled castes.
2. To study the awareness of students and heads of family regarding the educational schemes for facilitating education of the children belonging to the scheduled castes.
3. To study the sources of awareness about the educational schemes for facilitating education of children belonging to the scheduled castes.
4. To study the antecedent variables of the awareness level of the heads of family regarding the educational schemes for facilitating education of the children belonging to the scheduled castes.
5. To study the relationship between the awareness of heads of family about educational schemes and their utilization by children belonging to the scheduled castes.
6. To study the relationship between awareness of heads of family about educational schemes and the drop-out rate of children belonging to the scheduled castes.
7. To study the relationship between awareness of the scheduled caste heads of family about educational schemes and their attending children.
8. To study the relationship between awareness of the scheduled caste heads of family about educational schemes and their non-attending children.
9. To study the relationship between awareness of the scheduled caste heads of family about educational schemes and their out-of-school children.

10. To study the problems faced by the scheduled castes in the utilization of educational schemes for facilitating education of their children.
11. To identify the directions for procedural modification with a view to facilitating utilization of the educational schemes by the children belonging to the scheduled castes with particular reference to the conditions of eligibility, value of scholarships, awards, mode of payment, mode of publicity and submitting application.

Hypotheses

In order to realize the objectives of the study outlined above, the following null-hypotheses were formulated :

1. There is no significant difference in the awareness of educational schemes among urban, semi-urban and rural heads of family belonging to the scheduled castes.
2. There is no significant difference in the awareness of educational schemes among urban, semi-urban and rural students belonging to the scheduled castes.
3. There is no significant difference in the awareness of educational schemes among urban, semi-urban and rural male students belonging to the scheduled castes.
4. There is no significant difference in the awareness of educational schemes among urban, semi-urban and rural female students belonging to the scheduled castes.
5. There is no significant difference in the awareness of educational schemes between male and female students belonging to the scheduled castes.
6. Awareness of the heads of family about educational schemes and the caste within scheduled castes to which they belong are independent of each other.
7. Awareness of students about educational schemes and the caste within scheduled castes to which they belong are independent of each other.
8. Awareness of heads of family and students about schemes for their educational progress belonging to the scheduled castes are not significantly related.
9. There is no significant difference in the yearly income of the heads of family in rural, semi-urban and urban areas.

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10. There is no significant difference in the per capita income of the families belonging to the scheduled castes in rural, semi-urban and urban areas.
11. Awareness of heads of family about educational schemes and yearly income of the heads of family belonging to the scheduled castes are not significantly related.
12. Awareness of heads of family about educational schemes and per capita income of the family belonging to the scheduled castes are not significantly related.
13. The educational level of the heads of family and locations they belong to are independent of each other.
14. Awareness of heads of family about educational schemes and educational level of the heads of family belonging to scheduled castes are independent of each other.
15. The occupational level of the scheduled caste heads of family and the location areas are independent of each other.
16. Awareness of heads of the family about educational schemes and their occupational level are independent of each other.
17. Awareness of the heads of the family about the educational schemes and the utilization of educational schemes by their wards are independent of each other.
18. Awareness of heads of family about educational schemes and attending children are independent of each other.
19. Awareness of heads of family about educational schemes and drop-out rate of children are independent of each other.
20. Awareness of heads of family about educational schemes and non-attending children are independent of each other.
21. Awareness of heads of family about educational schemes and rate of out-of-school children are independent of each other.

Procedure

Population in the case of the present study has been defined as people belonging to the scheduled castes of the Union territory of Delhi. The unit of the sample was family. One hundred families from selected rural, semi-urban areas of Delhi were covered. At the first stage of selection of locations, the locations having concentration of scheduled caste population were selected. From these locations, families were selected randomly.

Two questionnaires and an awareness level scoring key (ALSK) were developed for the collection of data for the study. The first questionnaire purported to collect information from the scheduled caste heads of

family and the second one from the students. The ALSK was meant for assessing awareness of both heads of family and the students.

The data were collected during field work through administering the questionnaires to heads of the families and students covered in the study. The investigator filled in the questionnaires through interview from the illiterate heads of the family and from those who were literate up to primary stage. The questionnaires of students were filled in by the investigator through interview at the primary stage and beyond the primary stage questionnaires were filled in by the students themselves.

In order to test the hypotheses relating to awareness, t-test, chi-square and product-moment coefficient of correlation were computed. To analyse data regarding problems and suggestions, the percentages were calculated.

Findings

The significant findings emerging from the study are given below.

Sources of Awareness

The school is the major source of awareness of the heads of the families about educational schemes, since more than 50 per cent respondents have indicated this source. Only a quarter of them consider newspaper as the source, while a few consider neighbour's children, notice board in schools and colleges, teachers, friends and relatives to be the sources of their awareness.

Antecedents of Awareness

1. The awareness level of heads of the family tends to differ in different location areas. The urban heads of family have higher level of awareness about educational schemes than heads of the family in semi-urban and rural areas.
2. The trend in the awareness level of students about the educational scheme follows the trend in the awareness level of heads of the family. The students in the urban areas have higher awareness than those in semi-urban and rural areas.
3. When viewed sex-wise, awareness level of the urban male students is higher than that of the rural male students. The

- differences, however, were significant between urban and rural students on awareness about schemes only.
4. Awareness level of the urban female students is significantly higher than that of the rural female students. The awareness level of the semi-urban female student, was also significantly higher than that of rural female students while the difference between the awareness level of the urban and semi-urban female students is not found to be significant.
 5. Taking the total sample of students' awareness level of male students is found to be higher than that of the female students. The result holds good in the three location areas as well.
 6. There is association between castes within scheduled castes and awareness level of the heads of family irrespective of location areas to which they belong.
 7. There is association between the castes within scheduled castes and awareness level of the students irrespective of the location areas. This shows congruence between the awareness level of heads of family and students on this variable.
 8. The congruence between the awareness level of heads of the family and students is further corroborated by the significant t -values.
 9. The yearly income of the head of family differs in different location areas, namely, rural, semi-urban and urban. Urban heads of family having higher income level than that of semi-urban heads of family and semi-urban heads of family having higher income than that of the rural heads of family. The same trend holds good in case of per capita income of the families except in case of rural and semi-urban areas, where the difference in the incomes of families was not found significant between them.
 10. There is positive significant relationship between the income of the head of a family and his awareness level. In the differentiated results, however, the relationship is positive but not significant in the case of rural heads of family. The same trend features in the per capita income of the family and awareness of the head of family.
 11. The educational level of the head of a family belonging to the scheduled castes has association with location areas, namely, rural, semi-urban and urban areas. This implies that heads' educational level varies from area to area.
 2. Awareness of heads of families is associated with their educa-

tional level in the total sample when viewed differentially according to location areas, the awareness of head of family is not related to their educational level in rural area, while the relationship between the two variables exists in urban and semi-urban areas.

13. The occupational level of the head of a family has association with location areas, namely rural, semi-urban and urban areas.
14. There is relationship between the awareness level of heads of families and their occupation in the total sample irrespective of the location areas. However, differential results indicate that the two variables are not related in rural and semi-urban areas.

Consequences of Awareness

1. There is association between awareness of scheduled caste heads of family and utilization of the educational schemes by their wards as revealed by significant chi-square values. The result holds good in rural, semi-urban and urban areas. Higher the awareness level of heads of the family, the higher is the utilization of educational schemes.
2. The awareness level of scheduled caste heads of families about schemes for their educational progress of their wards is found to be significantly related to the attending children as revealed by significant chi-square value. The same results feature in rural, semi-urban and urban areas. Higher the awareness level of the head of a family the higher is the incidence of attending children.
3. The awareness level of heads of families about schemes has an association with the drop-out rate of children. The result holds good for the three location areas—rural, semi-urban and urban. Higher the awareness level the lower is the drop-out rate.
4. The awareness of heads of families about educational schemes have an association with the non-attending children. The result also holds good for rural, semi-urban and urban areas. Higher the awareness level the lower is the rate of non-attending children.
5. The awareness level of scheduled caste heads of families about schemes for their educational progress is found to be significantly associated with the out-of-school children (non-attend-

ing drop-out). The results are consistent in the three location areas as well.

Problems and Suggestions

1. More than one-half of the heads of families feel that the educational schemes are partly sufficient to meet the educational costs, while some (17.0 per cent) heads of families are of the opinion that the existing schemes are sufficient to meet the expenses of their children's education. About one-fourth of the heads of families consider that the educational schemes provided by the government for the welfare of scheduled castes are insufficient.
2. The heads of families suggested that the rate of scholarship should be increased. Ancillary services and uniforms should be given to all students belonging to scheduled castes. They also feel that residential hostels should be provided to their wards for providing environment for education which is absent at their houses.
3. The heads of families find the publicity of educational schemes as inadequate. They want timely publicity to be made more effective by using multimedia approach.
4. The heads of families have pointed to the social prejudices as reflected by the use of derogatory language for those availing the facilities. This, they think, should be remodified through educating public opinion on the issue.
5. The heads of families consider the condition of eligibility heavily biased in favour of privileged groups within scheduled castes. They may be reoriented to cater to the lowest section of the scheduled castes by making them more flexible. For example, failure of their wards is due to cultural deprivation and they are further deprived of the benefits of schemes as well. They also want relaxation in conditions of eligibility like raising the means, level and requirement of documents.
6. The indifferent and corrupt officers responsible for the implementation are also considered road blocks in the way of effective utilization of the educational schemes. Careful selection and effective supervision have been suggested as measures to tackle the problem.
7. The heads of families consider the difficulties at the time of receiving payment like irrational distribution, inefficient off-

cials, indifferent attitude of officials, cumbersome procedure, mode of payment and delayed payment. They have given suggestions to remove the difficulties through prompt payment, rational distribution, direct release of grants, legal guardianship, fixed date and time, payment in full and cash, and sympathetic attitude of the officials.

8. The heads of families consider the procedure for the renewal of schemes as cumbersome and unnecessary. The renewal should be automatic.

In general, the awareness of the heads of families has emerged as potential and desirable variable. Its antecedent variables indicate the direction for developing the awareness and its consequent variables indicate the methodology of implementing educational schemes. It is hoped that the findings of this study will be helpful to some extent in framing and implementing the educational schemes for the uplift of the scheduled castes.



Intellective and Non-Intellective Factors Associated with Engineering Creativity

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ENGINEERING education should encourage students to strive for the mastery of fundamentals, the discovery of relatedness of things, and the cultivation of excellence. But all the while it should also be a creative experience, stimulating the imagination of students

*Thesis submitted to Meerut University (1981)

and helping them to prepare themselves for the unresolved contests and the challenges of an imperfect world. But unfortunately, engineering educators as a group have not yet been concerned with the problem of creativity. There are deeply held feelings that engineering education today has become removed to some degree from the creative act that the engineer or inventor has to perform to bring the results of science and technology to the benefit of society. Although engineering by its very nature is a creative endeavour the identification of creative talent and its stimulation in the classroom are not yet recognized as the tasks of engineering educators. In this context Blade (1963) has also observed that "there is little notion of creative engineer in the minds of the public, although the image of the creative scientist is widespread... engineers are anonymous."

Objectives

The major objective of the present study was to compare quantitatively significant difference between high and low creative groups on certain measures of mechanical reasoning, perceptual simplicity complexity, intolerance of ambiguity and value orientations. Intrinsic to the central purpose were the following sub-problems :

1. To investigate systematically differences in mechanical reasoning which pertains to mechanical and physical principles in familiar situations, between high and low creative groups.
2. To compare differences between high and low creative groups on a measure of value orientations based on Spranger's theory of values.
3. To find out differences between high and low creative groups in their perception of cognitive simplicity and complexity.
4. To compare differences between high and low creative groups on a measure of intolerance of ambiguity.
5. To find out the contribution to each variable to the multiple correlation or more specifically the percentage of variance in the dependent variable (total creativity) accounted for by each of the ten predictor variables.
6. To rearrange or to reduce the data by factor-analytic techniques to smaller set of factors or components that may be taken as source variables accounting for the observed interrelations in the data.

7. To determine the validity and reliability of the measure of creativity used in this study.
8. To determine the reliability of the measure of perceptual simplicity-complexity for the present study.

Setting of the Problem

The sample selected for this study comprised of 522 students (all males) undergoing education and training in the area of mechanical engineering. These students were drawn from all the diploma level engineering institutions in the Union territory of Delhi. In the final analysis, however, a total of 400 students were studied who had responded to all the six instruments. The Ss ranged from 16-23 years of age.

Hypotheses

1. There is no significant difference between the high and the low creative subjects on the mechanical reasoning ability which could be regarded as one aspect of intelligence.
2. (a) There is no significant difference between the high and the low creative individuals in their theoretical value orientations.
 (b) There is no significant difference between the high and the low creative individuals in their economical value orientations.
 (c) There is no significant difference between the high and the low creative individuals in their aesthetic value orientations.
 (d) There is no significant difference between the high and the low creative individuals in their social value orientations.
 (e) There is no significant difference between the high and the low creative individuals in their political value orientations.
 (f) There is no significant difference between the high and the low creative individuals in their religious value orientations.
3. There is no significant difference between the high and the low creative individuals in their perception for cognitive simplicity and complexity.
4. There is no significant difference between the high and the low creative subjects on a measure of intolerance of ambiguity.

Instruments

The psychometric instruments administered to the subjects included (i) Purdue creativity test, Form H, (ii) Culture fair intelligence test, Scale 3, (iii) Mechanical reasoning test, (iv) Value test, (v) Perceptual simplicity-complexity test, and (vi) The Budner tolerance-intolerance ambiguity scale.

Determination of Groups

The Ss were classified into four groups, namely, the high creative-high intelligence, the high creative-low intelligence, the low creative-high intelligence and the low creative-low intelligence based on their joint standing on creativity index and intelligence score. For the four-fold classification of the Ss described above 2×2 analysis of variance technique was adopted to seek answer to the question if the different behavioural traits hypothesized in this study constitute a systematic function of creativity, intelligence or a combination of them. In addition, comparison of high and low creative groups (based on total creativity index alone), intercorrelations, multiple regression analysis and factor analysis were done.

Results

The following results were drawn based on the analysis of variance :

1. Statistically significant differences were found between high and the low creativity groups on the mechanical reasoning ability test indicating thereby a positive effect of creativity on mechanical reasoning. A highly significant effect was seen in the case of intelligence but the interaction effect was insignificant.

2. Results pointed out that the groups were homogeneous so far as theoretical value was concerned. No significant effect was seen in the case of intelligence either, and interaction effect was also insignificant.

3. The results explicitly indicated a positive and significant effect of creativity on economical value. The effect of intelligence and creativity-intelligence interaction remained insignificant.

4. The mean scores on aesthetic value of the high and the low creativity groups were not significantly different from one another,

although there was a slight tendency in favour of a positive effect of creativity on aesthetic value. Further, no significant effect was seen in the case of intelligence and interaction effect was insignificant.

5. The results on social value showed no significant effect for both creativity and intelligence. Interaction effect was also insignificant

6. On political value the high creative group and the low creative group did not differ significantly from one another. Again no significant effect was seen in the case of intelligence and interaction effect was insignificant.

7. The mean scores on religious value of the high and the low creativity groups were although not significantly different from one another there was a tendency in favour of a positive effect of creativity on religious value. No significant effect was seen in the case of intelligence, and interaction effect too was insignificant.

8. The high and the low creative groups did not differ significantly on three categories of figures of varying complexity. However, the results pointed out that the high creatives had a greater appeal for the complex, unfinished and the imperfect.

9. The results showed no significant differences on a scale of intolerance of ambiguity. A lesser mean of the high creatives, however, indicated that the high creatives were more tolerant of ambiguity.

In another type of classification based on the subject's relative standing on the total creativity index alone (without taking intelligence into consideration) high and low creative groups were compared on all the ten independent variables. Results obtained from this analysis are as follows:

1. High and low creatives differed significantly on intelligence, mechanical reasoning, economic value, aesthetic value, and religious value.

2. In the case of theoretical value and social value the means were in favour of the high creatives although the differences were not statistically significant.

3. Perceptual simplicity-complexity variable further evidenced statistically significant differences indicating that the high creatives had a greater appeal for the complex, unfinished and the imperfect.

4. Results indicated that the high creatives were more tolerant of ambiguity in comparison to the low creatives.

A study of intercorrelations of variables disclosed the following relationships between the variables:

1. Positive and significant correlation was found between intelli-

gence and total creativity. The correlation coefficient worked out to be 258 (sig. at .01 level).

2. Mechanical reasoning, economic value, religious value and perceptual simplicity-complexity were significantly correlated to total creativity.

3. Intolerance of ambiguity was negatively correlated to total creativity indicating that the creative engineers had the capacity to tolerate inconsistencies and contradictions and were comfortable with the ambiguous, approximate and uncertain. However, the correlations coefficient was insignificant.

The results of the multiple regression analysis indicated the following:

1. The single best predictor of creativity was intelligence. The second and third factors in order of importance were religious value and economic value. Multiple r between criterion variable and intelligence, religious value, economic value, simplicity-complexity was also found significant.

2. Varimax rotated factor analysis yielded five factors, namely, intelligence factor, values factor, factor of religious value, a stylistic factor and the factor of openness.

These intellectual factors seem to be necessary but not sufficient ingredients of creativity since they function not in isolation, but rather in relation to a total personality system of needs, attitudes, motivations, values, goals and emotions. The stylistic, motivational and personality characteristics along with cognitive factors, therefore, operate as important determinants in the realization of creative potentialities of young engineers.

Effect of Parental Deprivation on Personality Adjustment (With Special Reference to the Denotified Tribes of U.P.)

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RECENT TRENDS in scientific researches have shown tremendous interest in the area of deprivation. The term 'deprivation' is a multi dimensional concept as indicated by various social scientists such as : 'socially disadvantaged'—Havighurst (1964) and Deutch *et al.* (1968), 'psychologically deprived'—Kirk (1958), 'culturally deprived' - Riessman (1962), 'under achievers' and 'educationally deprived'. This is a general term covering a number of different stimulus ranging from partial to complete deprivation. Thus, a child is deprived even though living at home of his parents or permanent parents substitute is unable to give him the affectionate relationship that children need.

The Study

The purpose of this study was to investigate the differences of personality variables like adjustment, intelligence and academic achievement among tribal (deprived) and parental (undeprived) children. The following hypotheses were thus laid down :

1. There is no significant difference in the adjustment of the parentally deprived and those who are not parentally deprived.
2. There is no significant difference between the levels of adjustment of parentally deprived and undeprived children.
3. There is no significant difference between the main areas of adjustment of parentally deprived and undeprived children.
4. There is no significant difference between the levels of adjustment of the partially and fully deprived children.

*Thesis submitted to Agra University (1978)

5. There is no significant difference between the achievement scores of the parentally deprived and undeprived children.
6. There is no significant difference between the adjustment scores and general mental ability scores of parentally deprived and undeprived children.
7. There is no significant difference between the adjustment scores of rural parental group children with that of urban parental group children.
8. There is no significant difference between rural non-parental group children and urban non-parental group children in respect of adjustment scores.
9. There is no significant difference between male and female children in respect of adjustment scores.

The Sample

A sample of 670 students consisting of children (male and female) ranging from Class VIII up to intermediate standard (Class XII) of the age-group 13 to 16 were selected from the government Ashram-type schools and other schools and intermediate colleges of U.P. Keeping in view the sampling design, stratified cluster method sampling was considered for the present study.

Tools Used

For measuring the adjustment of the children Mittal's revised adjustment inventory (Hindi version) was used. The tool is chiefly meant for discriminating well adjusted students from poor adjusted ones. There are four areas in the inventory which provides separate measures of adjustment, viz. home adjustment, social adjustment, health/emotional adjustment and school/college adjustment. The reliability of the inventory by split-half method was +.94. For measuring intelligence, Jalota's group test of general mental ability was used. Its validity ranged between +.50 to +.78, respectively. The reliability coefficient came to +.932. Academic performance of the children was determined on the basis of half-yearly examination scores since annual examination marks were not available at that time.

Main Findings

Wide differences have been observed between tribal and parental children. The main findings of the study are ;

1. It has been found that the critical ratios are significant at .05 and .01 level of significance in respect of total adjustment scores among parental group children (PGC) and non-parental group children (NPGC).

2. CR's were significant within urban PGC (male) at .05 and .01 levels but there was no significant difference among 13 and 16 years urban PGC (male). Similarly, within rural PGC (male) significant differences are found among 13 and 15 years (.01). But in respect of the children in various age range no significant differences were found within rural PGC (male). While, in the same group (rural PGC male) in respect of 13 and 14, 14 and 15, 13 and 16, 14 and 16, and 15 and 16 years, respectively, no significant differences were found.

3. In respect of urban PGC and rural PGC significant differences (.01) were found among female children in various age ranges.

4. In NPGC of male children CR's were found significant at .01 level but 14 and 15 years (male) NPGC were not found significantly different on the basis of adjustment scores.

5. In respect of NPGC (female) of different age levels t's were found significant at .05 and .01 levels but among 13 and 15 years and 14 and 15 years no significant differences were found within NPGC (female).

6. In respect of grade-wise* adjustment scores amongst PGC and NPGC significant differences were found at .01 level while between 13 and 14 years in respect of D grade and 16 years in C grade, respectively, no significant differences were found.

7. Younger and elder groups' (PGC and NPGC) children in respect of C grade of adjustment were not significant.

8. Significant differences at .05 and .01 levels were found on the basis of grade-wise adjustment scores among urban male (PGC) and tribal male (NPGC) in various age ranges. While the children of 13 years, 15 years and 16 years, B, C and D grades, respectively, were not significantly different.

9. Rural male (PGC) and tribal male (NPGC) were significantly different (at .05 and .01 levels) on the basis of grade-wise adjustment scores. While the children of 13 years in respect of C and D grades and 16 years in C grade were not significantly different.

10. When the children of different age levels of urban and rural female (PGC) were compared with the tribal female (NPGC) significant differences were found at .01 level. While, in respect of other grades

*A=very good adjustment, B=good adjustment, C=satisfactory adjustment, D=unsatisfactory adjustment, E=very unsatisfactory adjustment.

(between 16 years urban PGC and rural PGC in C grade and 13 years rural PGC in D grade) of adjustment t's were not significant.

11. On the basis of area-wise* adjustment scores significant differences (.01) were found among PGC and NPGC.

12. In respect of younger (13 years) and elder (16 years) children no significant differences were found among PGC and NPGC. While, the children of 16 years PGC as compared with 13 years NPGC significant differences were found at .01 level in all the areas of adjustment scores.

13. When the grade-wise adjustment scores of the children of different age levels were compared between partially deprived and fully deprived children no significant differences were found at any level of significance. But the children of 15 years in C grade and 13 years in E grade respectively t's were found significant.

14. Partially and fully deprived children in respect of younger and elder groups t-values were found significant at .01 level in C and D grades, respectively, but the children of 13 years partially with 16 years, partially in C grade and 13 years fully with 16 years fully in D grade were not significant.

15. Significant differences were found amongst PGC and NPGC in respect of academic achievement scores.

16. On the basis of high achievement scores amongst PGC and NPGC t-ratios were found significant at .01 level but the female children of eighth and tenth grade t's were not significant.

17. On the basis of low achievement scores amongst PGC and NPGC t-ratios were not significant but the male children of eighth and ninth grades t's were found significant at .01 level of significance.

18. In respect of high achievement scores between PGC (rural and urban and NPGC t's were found significant at 0.01 level while the children of rural female of eighth grade and rural male of ninth grade similarly, rural and urban female children of tenth grade t's were significant.

19. In respect of low achievement scores between PGC (rural and urban) and NPGC t's were not significant while the children of rural male eighth grade t's were found significant at .01 level of significance.

20. In respect of total GMA scores amongst PGC and NPGC CR's were found significant at .01 level of significance in various age ranges.

21. In respect of total adjustment scores amongst various rural and urban PGC significant differences were found at .01 level of significance. While, no significant differences were found between 14 years rural and urban PGC and 14 years with 16 years children.

*According to Mittal (1974) : (a) Home adjustment, (b) Social adjustment, (c) Health and emotional adjustment, and (d) School/college adjustment.

22. On the basis of total adjustment scores of the different age levels among rural and urban non-parental group children t's were found significant at .05 and .01 level but the children of 13 and 14 years, 14 and 15 years and 15 years rural NPGC as compared with urban NPGC t's were not significant.

23. In respect of total adjustment scores of different age levels among PGC (male) and NPGC (female) t's were found significant at .01 level of significance.

24. In respect of total adjustment scores of different age levels among PGC (urban and rural female) as compared with NPGC (male children) t's were significant at .01 level while, 13 years NPGC (male) and 16 years rural PGC (female) t-ratio was not significant, similarly, 16 years NPGC (male) and rural PGC (female) t-value was not significant.

25. In respect of NPGC male and female children of different age levels on the basis of total adjustment scores t-ratios were significant at .01 level while, amongst 16 years male and female t-ratio was not significant.

26. In respect of total adjustment scores between male (PGC and NPGC) and female (PGC and NPGC) children, CR were significant at .01 level of significance. While, among 14 and 15 years and 16 years differences were not found significant.

27. In order to compare the findings with orphan children in respect of total adjustment scores a sample of 50 children (13-16 years) were also included in the present study. It is an incidental study to compare the orphan children with tribal children and parental children on the basis of adjustment scores. It was found that there are significant differences between these groups (i.e. orphan and tribal at .05 and orphan and parental children at .01 level).



A Study of the Analysis and Synthesis of Creativity Measures

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THE PRESENT investigation was undertaken in an attempt to analyse the nature of the abilities, most often referred to as the psychometric measures of creativity. In common terminology, the abilities representative of creative thinking have been identified as fluency, flexibility, originality and elaboration. Effort was made to analyse them through their relationship with certain measures of intelligence, personality-temperament and motivation traits. Need for such an investigation arose primarily because there are a few indications in the research literature that measures currently believed to indicate creativity involve the major connotations of intelligence or that of personality-temperament or motivation traits. The finding, however, in regard to the extent to which these types of measures contribute variations to creativity measures are fairly discrepant. It is also not known whether creativity measures in their multiple connotations (as relevant literature indicates) are more closely related to any of these three kinds of measures.

Purpose of the Study

The main objectives of the study were to ascertain and compare the proportion of variances attributable to the two types of intelligence, i.e. fluid (Gf) and crystallized intelligence (Gc), certain personality-temperament and motivation traits in contributing to both verbal and figural creativity. Underlying this objective was an assumption that measures of Gf, Gc, personality-temperament and motivation will contribute differently to the two types of creativity measures, i.e. verbal and figural. Treating all the variables simultaneously within the same theoretical frame, the study also envisaged to probe into their underlying factorial structure. Analysing creativity measures in these two directions, it was

*Thesis submitted to Guru Nanak Dev University (1979)

visualized, would help illumine the nature of the measures designed to indicate creativity.

Hypotheses

The following specific hypotheses were proposed :

1. Measures of crystallized intelligence (Gc) will account for more variance than fluid intelligence (Gf) in verbal creativity measures.
2. Measures of fluid intelligence (Gf) will contribute more than crystallized intelligence (Gc) in figural creativity measures.
3. Measures of creativity (verbal and figural) and intelligence (Gf and Gc) will be relatively independent of each other in terms of their factorial structure.
4. Verbal and figural cerativity measures will represent distinct creativity factors.

Methodology

Five hundred female students of Class XI drawn from six girls' higher secondary schools located in urban towns of Punjab State comprised the sample of this study. Out of the total sample of 500, a sub-sample of 100 subjects was reserved for the validation study. All subjects were administered six psychological tests for obtaining their scores on creativity (verbal and figural), intelligence (Gf and Gc), personality and motivation trait measures. The tests were :

1. Torrance Tests of Thinking Creatively with Words—Form A (Torrance 1966)
2. Torrance Tests of Thinking Creatively with Pictures—Form A (Torrance 1966)
3. Cattell's Culture Fair Intelligence Test, Scale 2, Form A (Cattell 1965)
4. Hundal's General Mental Ability Test (Hundal 1962)
5. High School Personality Questionnaire--Cattell 1967, Hindi version--Kapoor and Mehrotra 1967) and four factors of Sixteen Personality Factor Questionnaire (16 PF--Cattell and Eber 1962, Hindi version--Kapoor and Mehrotra 1970)
6. School Motivation Analysis Test (SMAT)--Sweeney, Cattell and Krug 1970, Hindi Version--Amir Singh 1974)

The following main analyses were carried out :

1. Product Moment Correlations
2. Stepwise Multiple Regression Analysis
3. Cross-validation
4. Principal Component Factor Analysis.

Major Findings

1. The overall relative efficacy of intelligence, personality and motivation measures varied with the two types of creativity measures, i.e. verbal and figural. Verbal creativity measures were contributed to more by intelligence particularly Gc followed by Gf, motivation and personality-temperament traits while figural creativity measures except elaboration were related more closely to certain personality-temperament traits followed by Gf, Gc and motivation measures. The same hierarchy was not maintained in elaboration. Apparently, figural elaboration seemed to have its own unique priority of determinants implying that some distinct influences might be operating to show their impact on the mental processes involved in elaboration.

The overall finding implies that abilities representative of intelligence are not equally important in contributing to creativity in a test situation as some investigators (Cattell and Butcher 1968) argued but that verbal and figural creativity measures though appearing to tap the same abilities are influenced by intelligence, personality and motivation in distinct hierarchical fashion. Thus cognizance must be given to the different kinds of creativity in assessing the importance of such variables for creativity even within the psychometric context.

Another interpretation pertaining to the differential role of intelligence, personality and motivation in creativity of two types could be that their relative importance may vary in real life creativity in diverse fields, say, scientific creativity or artistic creativity. There is already some evidence that different types of contents to which creative mental processes are involved, have an important bearing in creative people of different kinds.

2. Some variance operating in creativity measures was found to be linked with the abilities representative of intelligence (as indicated by psychometric test(s)) implying that intelligence to some extent is prerequisite for creative thinking. But taking even the highest value of multiple R (.45), it may be plausible to say that less than even one quarter of variance of a particular measure of intelligence in a creativity

measure may not be construed to doubt the usefulness of creativity tests or a particular creativity measure. The viewpoint (Wallach 1970, Ogletree and Ujlaki 1973) that creativity measures are essentially the measures of intelligence was thus clearly invalidated by the present evidence.

3. Some variance of creativity measures was found to be mediated by the abilities representative of intelligence particularly verbal comprehension and verbal reasoning in verbal creativity and figural reasoning in figural creativity. This overall mediation was, however, relatively less noteworthy in the case of figural creativity. The argument that creativity involves intelligence needs to be qualified by the observation—What kind of creativity? What kind of intelligence? Lack of such distinction may often plague efforts to properly interpret findings concerning creativity-intelligence relationship.

4. As expected, verbal creativity measures were contributed to more by Gc measures while figural creativity measures were attributed to more by Gf indices but there was not much difference between the variances of both Gf and Gc in figural creativity measures except in elaboration. The finding was interpreted both in terms of the differential expression of hemispheric specialization and also on the basis of the extent to which performance on verbal and figural creativity measures have or do not have the advantage due to extensive acculturation.

The evidence of relatively closer bond between Gc and verbal creativity seemed to suggest that verbal creativity being influenced more by cultural factors can perhaps be nurtured through cultural manipulation. No clear-cut evidence was obtained for relatively closer association between figural creativity measures and Gf (except elaboration). This would seem to leave the matter doubtful whether constitutional processes are more important in figural creativity although the cultural vulnerability of such measures is also not ruled out.

5. The results of factor analysis revealed that creativity and intelligence constitute distinct factors relatively independent of each other. The evidence brought to bear on the study thus seem to point to an imperative need for incorporating relatively newly discovered creative functions into any conception of human intellectual potential whatsoever.

6. Synthesis of creativity measures into two unified and cohesive modes of expression confirmed the multifactorial nature of creativity, specific creative functions being tied to specific media of expression, say, verbal and figural.

7. Although measures of creativity were contributed to by certain

personality-temperament and motivation traits but none of them could be visualized as closely congruent to any of the personality-temperament and motivation traits employed in the present study. There were no indications of justifying the contention that creativity measures involve the major connotations of temperament and motivation. The role of temperament and motivation had been found to be that of facilitating or debilitating the mental processes operating in the two types of creativity measures.

8. The magnitude of total variance attributed to by the indices of Gf, Gc, personality-temperament and motivation traits was higher in all the measures of verbal creativity than in figural creativity measures except elaboration. Among the measures of verbal and figural creativity, verbal originality and figural elaboration involved the variances of Gf, Gc, personality and motivation to a greater extent relative to other measures of verbal and figural creativity. The results of cross-validation revealed a good deal of consistency on a second sample.

Overall, while creativity measures were contributed to by certain measures of intelligence (Gf and Gc), personality and motivation could not be attributed primarily to any of these kinds of measures. The evidence thus to some extent upheld the distinct nature of creativity measures in psychometric tests as analysed in the present study. □

Research Note

Progress of Literacy during 1951-80

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ONE of the major problems faced by India after the attainment of independence in 1947 was the prevalence of mass illiteracy. The national leaders who chose democracy as our political creed, clearly foresaw that the success of democratic institution lay in conversion of low literate nation into that of high or full literate nation and with that goal in view they promised to abide by the Article 45 of the Constitution which read : 'The State shall endeavour to provide, within a period of ten years from the commencement of the constitution, for free and compulsory education of all children until they complete the age of fourteen years'. In pursuance of this direction, all states introduced free education for the children in the age-group 6-11 and excepting Orissa, U.P. and West Bengal, it is also free in the age-group 11-14. However, the ambitious pledge of the constitution-makers is yet to be fulfilled because of many socio-economic barriers.

In this paper an attempt has been made to evaluate the results of our achievement on the literacy front on the basis of data available in 1951, 1961 and 1971 census and the other various publications of the central and state governments. The census publication made it possible

to assess the progress of literacy up to 1971 according to rural/urban and male/female categorization and also at zonal and State levels. The other publications enabled to estimate the trend of the progress during the subsequent years

Concepts and Definitions

Unlike many statistical terms in which standards are either not developed or not strictly adhered to in India, the concepts of literacy of all the census showed remarkable uniformity which validates an attempt to compare the census figures. The concept is :

A person who can read and write was considered as literate. The test for reading is the ability to read any simple letter either in print or manuscript. The test for writing is the ability to write simple letters

The literacy rate is generally defined as the percentage of literate persons (as per definition above) in the total population, i.e.

$$\text{Literacy Rate} = \frac{\text{Number of literates} \times 100}{\text{Total population}}$$

But the literacy rate is often computed after excluding the population under 5 years of age, in which case it is called the effective literacy rate, which may be expressed as :

$$\text{Effective Literacy Rate} = \frac{100 \times \text{Number of literates}}{\text{Total population of age 5 years and above}}$$

Progress of Literacy

Conceptually the 1951, 1961, and 1971 census data on literacy are comparable but their geographical characteristics are different. The census did not cover Jammu and Kashmir and NEFA whereas the 1971 census covered these areas as well as Pondicherry, Dadra and Nagar Haveli which were integrated with India subsequently. Moreover, 1971 census also covered the territory of Goa, Daman and Diu which remained uncovered in 1951 and 1961. In order to estimate the growth of literacy on comparative basis one has to adjust for such changes in territorial coverage between census data. The adjusted and hence compar-

able data on absolute level of literate population are given in Table 1. The figures for literates in 1980 were obtained by taking into account the enrolment figure in elementary and secondary education, with proper adjustment for wastage (see Appendix).

TABLE 1
LITERATE POPULATION (in millions)

	1951	1961	1971	1980 (estimated)
Male	45.610	77.388	112.043	148.266
Female	13.651	27.505	49.372	73.628
Total	59.261	104.893	161.415	221.894

Sources : (i) *Census of India* (1951, 1961, 1971)

(ii) *India, 1977-78, India 1979*

It can be seen from Table 1 that nearly 162 million persons were made literate during 30 years of planned development. Though the figure for female increased by more than 5.5 times against 3.4 times for male but in absolute terms weaker sex lags far behind their sterner counterpart in sharing the fruits of educational development. This is revealed by nearly 60 million increase in female literates against nearly 103 million increase in male literates.

The increase in absolute literates itself does not reveal the true progress as it does not take into account the growth of population during census decade. To take care of population growth literacy rates are usually defined as the percentage of literate persons at a point of time. But the population of children in the age-group 0-4 years cannot be exposed to the definition of literacy, the rate calculated in this manner has to be adjusted for the population in the age-group 0-4 to truly reflect the literacy level. This is met by 'effective literacy rate' defined as the percentage of literates in the age-group 5 and more at a point of time. The effective literacy rate is presented in Table 2 for both the sexes.

TABLE 2

EFFECTIVE LITERACY RATE BY SEX

	1951	1961	1971	1980 (estimated)
Male	28.6	41.3	45.99	49.37
Female	9.2	15.7	21.97	27.19
Total	19.2	28.8	34.45	38.27

It is evident from Table 2 that literacy level of either sex has progressed considerably during 1951-80. However, the rate of progress has been uneven. If the difference of effective literacy rate in 1951 and 1980 be defined as the index of progress made during the span of nearly three decades, this index works out to 20.8 for male and 18.0 for female. This indicates that justice is being denied to fair sex by putting on the average 15 per cent more stress on strenge sex literacy, though their literacy were three times more frequent than fair sex in 1951.

Rural-Urban Differentiation

The growth of literacy in rural and urban areas is studied from the census data during 1951-71 and the estimated figures in 1980. The literacy figures are tabulated for the census from 10 per cent sample slips for the general population other than displaced persons. The literacy figures for displaced persons are available in a separate brochure. The literacy figures for rural and urban areas were worked out after adding figures relating to displaced persons. As the separate age-distribution of population for rural and urban areas was not available the available age-distribution for total population was utilized to adjust the population in the age-group 0-4 for the computation of the effective literacy rate. Adjustment for territorial changes during nearly the three decades were not considered necessary as they affect the results only marginally. Rural and urban effective literacy ratio in 1951-1980 are set out in Table 3.

TABLE 3
RURAL-URBAN EFFECTIVE LITERACY RATE

	<i>Rural</i>		<i>Urban</i>	
	<i>Male</i>	<i>Female</i>	<i>Male</i>	<i>Female</i>
1951	21.6	5.5	47.7	26.4
1961	32.8	9.5	65.1	39.8
1971	39.6	15.5	69.8	48.8
1980	45.7	19.3	74.1	53.7
Index of progress (1951-80)	24.1	13.8	26.4	27.3

Figures in Table 3 bring out clearly the wide gap in rural and urban literacy for both sexes, more markedly for females. Though in relative sense, the gap appears to some extent patched up but the index of progress, which may be interpreted as the measure of the stress put on the literacy of a particular group indicates that rural folk females were the worst victim of literacy ignorance during the period 1951-80. In other words, the group least exposed to literacy among the rural urban differentiation, could not even equally share the attempts made to enhance literacy. These statistics point out the need for focussing attention on rural areas with particular emphasis on females.

Zonal Differentiation

In a vast country like ours with considerable local variations, the global estimate does not reveal the true picture. Education till 1976 had been a State subject and hence implementation of the policies of education has varied from state to state and as such it would be worthwhile to study the literacy situation at state levels. A study at the zonal level may be of help in coordination of literacy programme from the point of view of balanced development of literacy levels among zones. The 1961 and 1971 census has not presented the literacy rate by zones. The literacy rate for the year 1951 has been recast for the reorganized boundaries of states and are published in the census volumes. The effective literacy rate for the zones worked out by considering the literacy figure and the population of age 5 years and above is presented in Table 4.

TABLE 4

EFFECTIVE LITERACY RATE BY ZONES

Zones	1951			1981		
	Male	Female	Total	Male	Female	Total
1. North Zone	21.5	67.7	14.9	46.31	26.4	(21.6) 36.4
2. Central Zone	19.3	3.9	11.9	40.31	15.5	(18.0) 27.9
3. East Zone	29.9	7.7	19.3	48.6	22.4	(16.3) 35.6
4. West Zone	35.8	12.5	24.8	59.2	33.6	(21.7) 46.5
5. South Zone	33.7	13.4	24.2	63.4	36.8	(26.1) 50.3

Figures in brackets indicate the index of progress.

The composition of zone for this study is :

1. *North Zone* : Punjab, Haryana, Himachal Pradesh, Delhi and Rajasthan. Jammu and Kashmir has been excluded as 1951 literacy is not available.
2. *Central Zone* : U.P. and Madhya Pradesh.
3. *East Zone* : Bihar, Orissa, W. Bengal, Assam, Manipur and Tripura. Nagaland has been excluded for non-availability of its population figure for 1951 and NEFA for its 1951 literacy figure.
4. *West Zone* : Maharashtra and Gujarat. Goa, Daman and Diu has been excluded as the 1961 census did not cover that area and Dadra and Nagar Haveli as the 1951 literacy figure is not available.
5. *South Zone* : Andhra Pradesh, Tamil Nadu, Karnataka, Kerala, Laccadive-Minicoy Islands. Pondichery has been excluded as 1951 literacy figure is not available.

It is evident from Table 4 that the central zone has the lowest literacy rate for both sexes throughout the three decades of planned developments. Both among males and females the south zone occupies the first place throughout the span of three decades. The literacy rate has shown varying degree of improvements during 1951-80 in different zones. The south zone has gone up in rank from second position in 1951 to first in 1980, the highest value of the index of progress being 26.1 while the rank of west zone has shifted from first to second position owing to relatively lower value of the index of progress. The ranks of other zones have remained unaltered. Zonal rate with all-India rate

points out to the desirability of stepping up literacy programmes in north, central and east zones.

State Differentiation

The effective literacy rate figures for 1951 and estimated figures for 1980 with their respective state wise ranks in 1951 and 1980 are indicated in Table 5. The literacy rate can be regarded as a variable which varies over space and time. Two statistical measures—(i) Rank correlation between 1951 and 1980 ranks, and (ii) Deviation around all-India value for 1951 and 1980—were calculated to facilitate interpretation of data. They are also shown in Table 5.

TABLE 5
LITERACY RATE BY STATES

Rank in 1980	State/Union Territory	Effective Literacy Rate		Index of Progress	Rank in 1951
		1951	1980		
1.	Kerala	46.0	74.3	28.3	1
2.	Delhi	43.4	70.1	26.7	2
3.	Andaman & Nicobar	29.1	52.2	23.1	3
5.	Tamil Nadu	23.5	49.6	26.1	7
7.	Gujarat	26.1	44.7	18.6	5
11.	Manipur	12.9	39.1	26.2	16
6.	Maharashtra	23.6	48.3	24.7	6
8.	West Bengal	27.1	42.4	15.3	4
14.	Assam	20.7	38.2	17.5	9
10.	Karnataka	21.8	41.7	19.9	8
9.	Punjab	17.2	42.1	24.9	12.5
3.	Laccadive, Minicoy	17.2	56.2	39.0	12.5
15.	Orissa	17.7	35.6	17.9	10
17.	Andhra Pradesh	14.8	31.4	16.6	14
13.	Tripura	17.6	38.4	20.8	11
20.	Bihar	13.7	26.5	14.8	15
16.	Nagaland	11.8	31.6	21.8	18
19.	U.P.	12.2	26.9	14.7	17
12.	Himachal Pradesh	8.7	38.7	30.0	21
18.	Madhya Pradesh	10.1	29.4	19.3	19.5
21.	Rajasthan	10.1	24.6	14.5	19.5
22.	Sikkim	8.2	21.8	13.6	22
—	All India	19.2	38.3	19.1	—
(i) Percentage Deviation around all India value					
		52	36		
(ii) Rank correlation between 1980 and 1951 rank					
		88			

It can be seen from Table 5 that literacy rate in the states of Madhya Pradesh, Orissa, Assam, Bengal, Andhra Pradesh, Bihar, Nagaland, U.P., Sikkim and Rajasthan are lower than the all-India rate and hence special attention may have to be paid in these states in stepping up literacy. Kerala occupied the first place and Delhi the second in respect of literacy during these three decades of planned development. The lowest literacy among the Indian states is recorded in Rajasthan. An examination of their index of progress, which is of special interest in evaluating their performance during 1951-80, indicates some useful results. The index of progress for India is 19.1. A five-point scale has been constructed for measuring the progress of literacy in various states. We assign the remarks very good, satisfactory, poor and very poor accordingly as the index of progress was more than $(19.1 + 2\sigma)$, $(19.1 + \frac{1}{2}\sigma)$ to $(19.1 + 2\sigma)$, $[(19.1 - \frac{1}{2}\sigma) \text{ to } (19.1 + \frac{1}{2}\sigma)]$, $[(19.1 - \frac{1}{2}\sigma) \text{ to } (19.1 - 2\sigma)]$, less than $(19.1 - 2\sigma)$, which is presented in Table 5A.

TABLE 5 A
INDEX OF PROGRESS OF STATE

Index	State
more than 31.5	Laccadive, Minicoy
22.20—31.50	Kerala, Delhi, Andaman and Nicobar, Tamil Nadu, Manipur, Maharashtra, Punjab, Himachal Pradesh
16.00—22.20	Gujarat, Assam, Karnataka, Orissa, Andhra Pradesh, Tripura, Nagaland, Madhya Pradesh
6.70—16.00	West Bengal, Bihar, U.P., Rajasthan, Sikkim
Less than 6.70	None

The rank correlation between 1951 and 1980 ranks works out to 0.88, which indicates a high association between ranks of these years, or, in other words, the high ranking state in respect of literacy in 1980 more often associated with a high rank in 1951 also. The variability expressed as a percentage of the All-India value, although reduced from 52 to 36 between 1951-80 is still high enough indicating the scope for narrowing down the gap in literacy level among states.

State-wise Sex Differentiation

In this paragraph, the association between ranks and variability between male and female literacy in 1980 is studied. The effective literacy rate, rank correlation between male and female literacy, percentage deviation of male and female literacy around all-India value are all indicated in Table 6.

TABLE 6
MALE-FEMALE LITERACY

Rank of Male Literacy 1980	State/Union Territory	Rate in 1971 Male	Female	Rate in 1980 Male	Female	Rank of Female Literacy 1980
	India	45.95	21.97	49.37	27.19	
1.	Kerala	77.13	62.53	80.13	68.34	1
2.	Delhi	72.55	55.56	78.83	61.25	2
3.	Pondicherry	66.58	40.14	71.31	44.32	3
8.	Manipur	53.70	22.87	57.62	25.43	14
5.	Tamil Nadu	59.54	30.92	60.34	36.81	6
7.	Andaman and Nicobar	58.82	38.29	62.07	42.17	5
8.	Maharashtra	59.40	31.00	62.27	34.24	7
9.	Gujarat	53.78	29.00	56.12	33.19	9
10.	West Bengal	49.57	26.56	54.61	29.97	10
15.	Assam	44.31	23.52	49.52	26.83	13
11.	Karnataka	48.51	24.55	53.63	29.66	11
4.	Laccadive, Minicoy	67.33	36.03	71.01	42.22	4
16.	Orissa	44.50	16.29	49.44	21.69	17
13.	Punjab	46.22	29.91	49.91	34.22	8
17.	Haryana	44.02	17.77	49.01	21.42	18
19.	Andhra Pradesh	38.43	18.32	42.42	20.40	19
21.	Bihar	35.78	10.24	39.79	13.21	24
14.	Tripura	46.84	24.84	49.87	26.88	12
22.	U.P.	36.69	12.46	39.36	14.54	21
12.	Himachal Pradesh	50.32	23.67	52.31	24.97	15
	Madhya Pradesh	38.77	13.08	41.37	17.42	20
18.	Nagaland	39.65	21.56	43.66	23.55	16
23.	Rajasthan	33.87	10.06	35.76	12.82	25
25.	Sikkim	28.52	10.31	30.32	13.25	23
24.	Jammu and Kashmir	31.01	10.94	33.41	14.14	22
26.	Dadra and Nager Haveli	26.79	9.50	28.72	11.21	26
Percentage deviation of all-India value				31	63	
Rank correlation between male and female literacy					.91	

It can be seen from Table 6 that rank-correlation worked out to .91 which indicates a high association between the ranks of male and female literacy rate in 1980 among states. In other words, a state having a high literacy for males, by and large, has a high literacy for females also. The variability expressed as percentage of all-India value work out to 31 per cent in case of males and 3 per cent in case of females, which reveal larger variation in respect of female literacy levels than male among states. These statistics point to the need for emphasis for reduction of disparity in literacy levels among states, more particularly among females.

Conclusions

The following are the broad findings of this paper :

1. In absolute numbers, the female literates have increased by five times, as against three times increase in case of males during 1951-80
2. The effective literacy rate stood at 38.27 in 1980 (male : 49.37 and female : 27.19). Although literacy among males and females progressed during the plan decades, the male literacy moved faster, thereby enlarging the gap in the literacy levels between two sexes.
3. There is a wide gap in literacy levels between rural and urban areas, the divergence being more marked in case of females.
4. The Central Zone and Northern Zone are below the all-India literacy rates in case of both the sexes whereas, the Eastern Zone is below the national level in case of females only.
5. The rank correlation of literacy rates of states revealed that there exists a high association between 1951 and 1980 literacy rates. The study has also revealed that there still existed a large variation in literacy levels in 1980, viz. 3 per cent of all-India value compared to 52 per cent in 1951.
6. The association of ranks between male and female literacy rate in 1980 is also high. The variability is 31 per cent of all-India rate for male and 63 per cent for females which reveals larger variation in literacy levels of females among states in the year 1980.

APPENDIX

The entire paper is based on the projected literacy figure, which has been worked out taking into the following considerations :

- (a) Number of literates in 1971 (sex and region-wise)
- (b) Death rate prevalent during 1971-80
- (c) Remainder of the literates in 1980 of literates in 1971 were computed by exposing them to prevalent death rate
- (d) (i) Total enrolment figure in secondary education during 1971-80 (recent targets were taken into account)
- (ii) Westage rate in primary education (w)
- (e) Total No. of literates in 1980 were computed as

$$L = R + (I - W/P) - S + O$$
- (f) Other sources of education were not taken into consideration owing to non-availability of any reliable dates. □

Book Reviews

A Perspective on Non-Formal Education and NAEP

Participation, Learning and Change. PAUL FORDHAM. Commonwealth Secretariat, Marlborough House, Pall Mall, London, SW1Y 5HX, 1980, pp. 223. Price : £ 5.

Non-Formal Education and the NAEP. A.B. SHAH and SUMMEELA BHAN. (Eds.). OUP, Delhi, 1980, pp. 245. Price : Rs. 65

PUT TOGETHER these two books furnish a perspective on non-formal education including NAEP. The Commonwealth Secretariat publication is the result of the seventh Commonwealth Education Conference's recommendation made in 1977 in Ghana, to hold a special conference on 'Non-formal education for development' eventually held at Delhi in 1979 and whose papers form its content. "The collective wisdom and experience of the delegates and resource persons at the conference have provided the essential raw material for this book" is what Paul Fordham says in the introduction.

The idea of 'non-formal education' as distinct from practice is rather new. Until 1970 it had not been defined although Philip Coombs did talk about it in 1968. In practice, however, it is as old as the family or the tribe. In its modern connotation non-formal education is meant for the drop-outs and the left-outs of the formal system to which it serves both as a bridge and an alternative. For Malcolm Adiseshiah 'non-formal education is people's power' but in order that it succeeds Kazim Bacchus holds "unless there is massive structural transformation in the reward system...NFE will never be fully accepted by the general populace and will remain no more than a peripheral activity

in the field of education . . ." NFE is not likely to succeed if its objective is to lower the occupational aspirations of the masses to a more realistic level, i.e. to make them feel satisfied with the children earning low-wages in the traditional sectors. If the politicians push NFE without trying for an equitable distribution of wealth, they would soon be disappointed to find it rejected by the masses.

The need is, therefore, to link NFE with economic development: "It can be seen that this economic improvement before literacy approach is very far removed from the traditional literary class, run by a tired primary school teacher or a community volunteer." One could also start with literacy first but the approach has to be participatory. The NFE can have three sets of objectives—(a) the immediate which is removal of illiteracy, (b) the middle-range application of 'new' knowledge to resolve economic, cultural and social problems, and (c) long-range—to provide for life-long education.

NFE is somehow taken as a synonym with certain kinds of adult education. The Delhi conference showed its concern for non-formal education giving children and young people outside the school a sense of place and purpose in their society. Its purpose should be to provide functional skills for personal development, for employment and for community life. For young children the emphasis should be on meeting basic, social and learning needs related to local social, cultural and community conditions. NFE for school-age children thus merges into provision for unemployed youth.

As one advances with defining and refocussing NFE one comes across the idea of recurrent education or the 'distribution' of education over the life-span of the individual a recurring way, that is, in the alternation with other activities, principally with work." Therefore, "a move towards recurrent education requires a convergence of formal schools and of NFE to a point where the latter ceases to exist and we come to think of education as more of an undivided whole".

The book edited by A.B. Shah and Susheela Bhan covers some of the ground already negotiated by Paul Fordham and adds a few significant areas on its own. All the thirteen papers that form part of this publication contribute to either explaining what NFE is in India or how NAFEP was conceived and launched. In other words, this book provides a real view of what is happening under these two schemes. S.C. Dube concludes that "we are thus left to face the challenge with non-formal methods and channels". But the weakness in the form of lack of literature for the neo-literates is quite glaring because this literature is

simply being not written. S.C. Shukla finds a contradiction in the concept of NFE because "the very process which arises from formalization and institutionalization is sought to be either deinstitutionalized and deinstitutionalized or, presumably formalized and institutionalized differently. Paradoxically, in the course of developing this process, a new institutionalization and formalization, however small, seems to follow". He finds support for his thesis in the Chinese experience. B.G. Verghese laments about Indian planning which has "tended to focus on people than on things", and feels quite sorry why media has not been used for education as well as for farming. D.P. Pattanayak pleads for developing teaching-learning materials in the regional, preferably local dialects if NFE is to make any serious dent in our mass-literacy programme. "Adult education material cannot be constructed on the basis of its ability to fulfil the demands of large-scale printing, forced distribution of textbooks and easy accounting, the life-styles of a consumption-centred industrial society, or the technical perorations of highly schooled pedagogues. It can only be a cooperative effort in which the learner plays the pivotal role." Amrik singh suggests that as the existing structure of higher education cannot be dismantled "it must be made more functional and more accountable than it is at present".

Anil Bordia explains the 'how' and 'why' of NAFEP besides its distinctive features. "The NAFEP differs from previous adult education programmes in that it provides for adequate administrative and resource support and emphasizes need-based curricula and teaching and learning materials; but it is unique in emphasizing evaluation and all stages on a continuing basis. All training programmes and teaching and learning materials are to be protested, and also subjected to impact studies. Bordia concludes on a happy note when he cited an Upanishad "great achievement one not for these steeped in doubt".

A.B. Shah is sceptical of the success of NAFEP because of the given social and political reality of India. The Indian bureaucracy would see to it that it fails "in the ostensible interest of preventing the development of social and political tensions". Also, in a country where nearly half the revenue of the government is spent on the salaries and prerequisites of its employees, even the little that is accomplished would be a remarkable achievement". In a way Shah counter-balances Bordia's optimism.

Susheela Bhan's paper is perhaps the most critical. She cites from M. Carnoy and H.M. Levin's research publication *The limits of educational reform* (New York, 1976) who demonstrate that poverty, inequality, prejudice and oppression cannot be eliminated, nor even

reduced, through educational programmes. Levin came to the conclusion while reviewing well-known education and training programmes of "The War on Poverty" that education fails to achieve its objectives if they are directed toward altering characteristics that derive from the basic political, economic and social functioning and structure of a society.

Miss Bhan does not agree with the implied assumption in the NAEP document under review which seems to suggest that the ignorance of the weak produces inequality and exploitation and if one educated them they will vanish. Morarji Desai (1977) said, "If we have literacy throughout the country within five years, I think we should have done a great task. I would not be so haunted by anything else because then we will have laid a firm foundation in this country never to slide back into either poverty or ignorance or anything else". This is what Susheela Bhan would say is inaccurate and untrue. She is still asking: (i) Can non-formal education fight those with a vested interest in under development, given the fact that NFE programmes are controlled by them? (ii) Can it cure the country of the dependency syndrome Julius Nyerere has talked about? (iii) In view of the failure of the classical models used so far, can NFE reverse the direction of such policies and make a clear break with the past?

Chitra Naik tries to confirm Miss Bhan's doubts when she says: "that in spite of small and big efforts at educating poor adults over the last forty years, the nature of the clientele and its problems have changed very little". And she regards NFE as the only hope and demonstrates how commitment to it resolved problems at three centres.

Tapas Mazumdar's is an academic paper in which his problem is more of methodology than of the area of study. For analysing the cost-benefit of the NFE programme he would want a new economics of education based on its own capital theory, leading to its own special notions of multiple-cost curves, set against a framework of extra-market and non-marketable returns.

M.S. Adisheshiah's forms the anti-thesis of Susheela Bhan's own assumptions and Carnoy and Levin's findings. For him education leads to equality in an unequal society, brings about attitudinal changes and helps build improved public leadership. He suggests that savings of the formal system be directed to NFE as already suggested in Tamil Nadu. J.P. Naik is in agreement with Adisheshiah and would ask the government to allocate more funds for NFE.

With these two books already in the market we now need to test their assumptions and hypotheses than go on discussing this or that concept or a model. They provide us with enough material to discuss and formulate a workable NFE programme. With all the cautions, academic discussion in the field may now be given over to workers who still have the Upanishadic faith in their] actions.

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Basic Needs In Indian Planning and Women In the Labour Force

The Basic Needs Approach to Indian Planning (1980), Pp. 78, Paper, Price : \$3.00, *Women in the Indian Labour Force* (1981), Pp. 137, Paper, Price : \$5.00 (both published by the International Labour Office—Asian Employment Programme —Asian Regional Team for Employment Promotion, Bangkok)

THE FIRST volume under review contains the proceedings and papers of a seminar on 'The basic needs approach to Indian planning' held in Trivandrum in July 1980. Apart from Ashok Rudra's principal document for the seminar titled 'The basic needs concept and its implementation in Indian development planning', which has not been included in this volume, three papers were presented in the seminar. D.T. Lakdawala in his paper 'Redistributive policies and basic needs in Indian planning' describes in detail the basic needs strategy envisaged in the now aborted Sixth Five Year Plan (1978-83) and compared this Sixth Plan approach with the approach adopted by the earlier plans in India. Lakdawala also assessed the impact of 30 years of planning in India on poverty and employment. B.G. Varghese described in his short note on 'Basic needs' the false perceptions of planning and development in India. For example, he rightly pointed out that "Development largely excluded

human development and investment in man in health, housing, drinking water and primary education, in 'equality' and 'fraternity'—was regarded as a welfare or social service rather than 'development' *per se*. Development meant things or areas, not people". He described how the poor never did so well as during officially declared famines as in 1966-67 and 1971-72. "The famine over, they returned to destitution and neglect". The other paper in the volume 'The eluding panacea' by M.L. Dantwala contains essentially comments on Ashok Rudra's background paper. Dantwala observes that the modalities of bringing about the social reorganization as visualized by Ashok Rudra such as pooling of productive resources in rural areas, tie-up of employment and development planning, and special schemes such as small farmers' development activities, tribal sub-plans, etc. elude us. The first half of the volume running into 33 pages contains an extremely valuable summary of the proceedings of the seminar.

The proceedings and the three papers of a national workshop on 'women in the Indian labour force' held in Trivandrum in July 1980 are published in the second volume under review. The lengthy paper titled "Women in the labour force in India..." by K.C. Seal presents a macro-level statistical profile of labour force by sex, age groups, industrial category, work status, employment sector and by several other characteristics, pooling information collected from several sources. The paper deals with various theoretical and empirical issues in this context. Seal also makes a critical review of the various sources of statistical information on women in the labour force and discusses about their comparability and the necessity for coordination between several sources like the NSSO and the census. In sectors sensitive to sex-based discrimination in respect of job-opportunities, employment conditions, wage rates, etc. Seal suggests that "there should be provision for regular monitoring of programmes/projects" which may shed light on gross forms of discrimination by sex.

Swapna Mukhopadhyay in her excellent paper on 'Women workers of India: A case of market segmentation', focusses her attention on male-female earning differentials, an important, though not the first, dimension of segmentation, and on occupational distribution and occupational concentration of women workers in India. While the paper is confined to market segmentation only, extension of the approach to labour market discrimination in wages and employment would have been interesting.

Based on a review of the available micro and macro-level studies, G. Parthasarathy and G. Dasaratharama Rao in their joint paper titled

'Women in the labour force in India' attempt to identify and explain the supply responses of female labour to various employment programmes, disabilities of female labour in relation to access to credit, inputs and markets in pursuing self-employment and the inter-relationship between economic development (or under development) and economic and social status of women in the labour market. The first chapter of the volume presents a summary of the proceedings of the workshop.

The two volumes under review should be of considerable interest to students and teachers of economics of planning and economics of labour. The several papers in these volumes are not only informative, but also provide conceptual clarity. Several substantive issues received knowledgeable treatment from the authors in these volumes

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Relationship of Constitutional Factors to Learning Difficulties among Primary School Children

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The present research is a study of the relationship of learning difficulties to constitutional factors, namely, visual perceptual development, expressive language development, visual and verbal sequential memory, auditory discrimination, fine motor development and fine visual motor coordination among a sample of primary school children from two schools of Visva-Bharati, India. The children of two schools are compared for their development in different functions, as they are from different socio-economic and educational background and urban and rural conditions. The results show that the poor expressive language development and poor visual perceptual development (perceptual organization) relate to learning difficulties. But poor language development seems to be a primary factor leading to learning difficulties. For the children coming from upper middle class and cities, learning failure is associated with poor language development. While for the children from low and middle socio-economic groups and villages, in addition to poor language development, poor visual perceptual development is also found to relate to learning difficulties.

IN INDIA, study of the reasons for children's learning problems have either been ignored or only few variables contributing to learning process, like socio-economic background and motivational factors have been studied. There is a need to look at children's learning process from biological point of view. Study of constitutional factors to learning is still at an earlier stage. It is important to identify the

relationship of constitutional factors to learning and understand the process of learning itself. Such understanding will give the adequate tool to teachers for diagnostic work, and also prevent them from saying "he is lazy" or "he is failing because of his family background, his brother is also like that", etc. etc.

The constitutional factors which have been identified or considered significant in the process of reading include : intelligence, fine motor coordination or minor neurological signs and higher cortical functions. These functions consist of factors such as perception, memory, attention, symbolic thinking, etc. High relationship of IQ to academic achievement is a known fact. However, IQ is also known to correlate with social class, race, degree of urbanization, family size, institutionalizations, income (Deutsch 1964, Lesser 1963, Anastasi 1958, Klineberg 1935, Lee 1951). In other words, IQ varies with experience and that social factors do affect level of intelligence (IQ score). The second constitutional factor associated to learning difficulties has to do with abnormalities of the 'extended' neurological examination which lead to diagnosis of 'minimal brain dysfunction'. The term 'minimal brain dysfunction' is used in relation to those children who have atleast some 'soft sign' abnormalities demonstrable objectively.

From the findings of the different researchers (Prechtle 1962, Peters *et al.* 1975, Rutter 1973, Wolff and Hurwitz 1973) it appears that there is some association between learning difficulties and increased incidence of 'soft sign'. But as yet there is no overwhelming evidence for the existence of specific syndromes. It must also be noted that many, apparently normal children, have abnormalities of 'soft signs'. It is possible that 'soft sign' abnormalities exist merely as a danger signal that 'something' is wary in the brain. 'Soft sign' cannot be directly taken as causal. Mere presence of this does not explain why a particular child cannot learn.

The third category of constitutional factors concerns with defects in higher cortical functions, e.g. perception, memory, attention, symbolic thinking, etc. There are a number of difficulties in studying the relationship between higher cortical functions and learning difficulties. The reasons being : (i) Higher cortical functions are not properly defined or that there are different opinions in the definition of cortical functions. (ii) Different authors present different theoretical modes to explain learning and thus they emphasize different higher cortical functions as being crucial in the process of learning.

Instead of listing different theoretical models and different factors which theoreticians have studied and considered important in the

problem of learning difficulties, research results on the main higher cortical functions (perception, memory, language and attention) will be discussed in this paper. Researchers have studied a number of functions under the title of 'visual perceptual factors', e.g. visual discrimination, perceptual organization, form constancy, figure ground perception, visual memory, etc. Longfellow and Freeman (1976) reviewing the relationship between the reading disability and perceptual defects state that on the basis of the available research it is very difficult to conclude that there is a positive relationship between the two. Only a few studies have controlled for age, IQ and other factors and then only moderate correlations coefficients with reading are found. On the other hand, there are a number of studies which find no correlation between the two.

The relationship of visual perceptual factors, in particular perceptual organization and visual memory, to learning difficulties is also examined in this research. The other purpose for studying the relationship between the perceptual factors and learning difficulties is to see the correlation between perceptual factors and socio-economic factors. In the U.S. it is shown that black children perform better on visual perceptual tests than on the tests of verbal areas, while the middle class white children perform well on both these areas.

Deficiencies in auditory perceptions have also been cited by some theoreticians as reasons behind reading difficulties. However, auditory perceptual difficulties (auditory discrimination, auditory memory, sound blending), when present, do not always lead to poor reading, and not all poor readers have their difficulties explained by poor auditory processing. Many good readers score poorly on tests for auditory perception, and some poor readers score well. In the present research children are assessed on auditory discrimination and short-term auditory (verbal) sequential memory.

Difficulties in language development is considered by some to be responsible for the reading problem. Language pathology includes delayed acquisition of speech, articulation problems, inability to recall the names of people and objects (dysnomia), expressive aphasia including using wrong words (paraphrasia), inability to use correct syntax even though one 'knows' correct usage and can recognize errors (syntactical aphasia), and receptive aphasia, which refers to difficulty in comprehending the spoken word.

Several studies find an association between delayed acquisition of speech and reading problems (Ingram 1956, Rutter 1970). Ingram found evidence of articulatory apraxia, dysnomia and receptive aphasia in children having reading problems. Rutter also finds a significant

correlation between reading retardation with poor complexity of language and inadequacy of description. Many reading specialists have noted anomie quality of expressive language of many dyslexic children. Jonsky and Dehirsch (1973) have proved that a test of naming is the first among five most significant predictors of reading progress.

In conclusion, language pathology like dysnomia, difficulties in receptive and expressive language is found in children having reading difficulties. In the present study development of expressive language at the full sentence level and at the one-word level is studied. The test for receptive language in Bengali is not available and adaptation of any other test in Bengali was not possible due to limited time, thus receptive language is not studied in this research.

The word 'hyperkinesis' or 'hyperactive' is often used for children having learning problems. The reason for this is that these children are often very active and distractible and do find it difficult to pay attention. It has been recognized that assessment of attention is extremely difficult as a result this factor is not studied in the present research.

The relationship of some of the constitutional factors discussed above to learning difficulties is examined by taking a sample of primary school children from two schools (Shiksha-Satra and Patha-Bhavan) of Visva-Bharati, Bengal, India. The two schools have the same educational philosophy but the children come from different socio-economic and educational backgrounds. In addition, Shiksha-Satra children come from the villages around the area and the Patha-Bhavan children are from cities. This enables a comparative study of learning difficulties among children of different socio-economic and educational background as well as urban and rural conditions.

Purpose

Hypotheses

1. The poor and good learner groups of Shiksha-Satra and of Patha-Bhavan will show differences in the development of the constitutional factors, namely, visual perceptual organization, expressive language at one-word and at full-sentence level, verbal and visual sequential memory (short-term), auditory discrimination, fine visual motor coordination and minor neurological signs.

2. The Shiksha-Satra and Patha-Bhavan children will not show

any difference in the development of the above-mentioned factors and also in intelligence.

The purpose of the above comparison was to examine relative importance of different constitutional factors in the process of learning, and also to examine the relative importance of the right and the left hemisphere functions, i.e. visual perceptual functions and verbal functions. In addition, the children of the two schools were compared in order to examine whether the children of different socio-economic and educational background as well as urban and rural conditions vary in their development of different functions.

Measures Used and Operational Definitions of Dependent and Independent Variables

Instruments were selected on the consideration that norms on these tests for Indian children are available, and/or that they are adaptable for Indian conditions. (Adaptation is done by conducting a pilot study.)

Learning Difficulties

Learning difficulties were assessed by performance on reading. There was no standardized reading test available in Bengali, therefore, children's reading level was assessed on the basis of the ratings given by the teacher of Bengali language.

Cognitive Development (Intelligence)

Two tests were used to assess intelligence : Raven's Coloured Progressive Matrices Test and Piagetian Tests—Classification and Seriation. Raven's Test gave percentile score while the Piagetian tests gave cognitive developmental stage scores. Two Piagetian tests—classification and seriation—were used to assess children's stages in cognitive development. Objects from children's day-to-day life were selected as testing material, e.g. beads, twigs, balls, coins. The stages of cognitive development are : pre-operational, concrete and formal. The operational definitions of these stages for classification and seriation tests are as follows :

Classification

Pre-operational—Stage I : The elements are connected with successive similarities between one object and the next. While arranging the objects S changes the criteria. All the elements may not be assigned.

Concrete—Stage II : The child uses all the elements. There is a sub-division of collection but no class inclusion.

Operational—Stage III : In classification of elements there is class inclusion.

Seriation

Pre-operational—Stage I(a) : No attempts at seriation.

Stage I(b) : Small uncoordinated series (The child arranges elements in sub-series of 2, 3 or 4 elements, which he cannot then put together).

Concrete—Stage II : Success by trial and error.

Operational—Stage III : Success with operational methods.

Visual Perceptual Development

For studying visual perceptual development visual perceptual organization was assessed. Visual perceptual organization refers to the child's ability to analyse and synthesize the visually presented material, which does not require any verbal response. Block design and object assembly tests from Weschler Intelligence Scale for Children were used which gave scale scores. Norms on Indian (Gujarati) children were used in computing scale scores.

Language Development

For assessing language development the child's expressive language at one-word level and at full-sentence level was studied. For receptive language in Bengali no test was available, hence, it could not be assessed.

Expressive language at one-word level : Picture Word Articulation Test in Bengali language was used to assess the one-word naming capacity. This test was constructed on the basis of the Picture Word Articulation Test in Gujarati language by the researcher. In this test S obtained two scores : (i) total number of items passed, and (ii) total number of errors committed. Errors include :

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- Error A : Long reaction time (more than 6 seconds).
- *Error B : Long reaction time and giving answer without prompting.
- Error C : No answer or wrong answer, and after giving some indirect clue, coming up with the right answer.
- Error D : No answer or wrong answer, even after prompting, not giving the word.
- Error E : Wrong word but very close to the picture, i.e. belonging to the same class of objects.
- Error F : Initial displacement of the word, but eventually giving the right word.
- Error G : Displacement of the word and also not finding the right word.

Expressive language at full sentence level : Expressive language at the full-sentence level was assessed by showing three pictures (10" × 15") placed in a specific order and asking S to make a story about what he or she sees in the pictures. The theme of the story is taken from the picture arrangement sub-test of WISC, CAT and adapted to Indian situation. These interviews were tape-recorded. In the instructions Ss were informed with which card the story begins and with which it ends. If there was any resistance on the part of a S, the experimenter (E) encouraged him or her to tell the story. The stories were rated independently by E and a Bengali professor of linguistics of the teacher training department of the university. The following factors were taken into consideration : (a) reaction time, (b) continuity in thought, (c) vocabulary, (d) grammar and, (e) fluency. The two raters discussed and clarified the definition of the five factors before they started to rate the stories.

(a) Reaction Time : For scoring reaction time a three-point scale was used.

Point 3 : S starts telling the story immediately and finishes without further questioning or S takes some time before starting but finish telling the story without any questioning.

Point 2 : S takes some time before starting and at the same time needs probing to complete the story.

Point 1 : Throughout the period of testing, E has to ask questions to the S in order to get a response. S also takes long time in answering questions.

*Error B was dropped in the final computation as the analysis showed that there was no difference between Error A and Error B.

(b) Continuity in Thought : Continuity in thought was scored on a five-point scale.

Point 5 : S is able to connect the content of the three pictures and makes a story.

Point 4 : S is able to connect the content of the three pictures and makes the story. However, S leaves out some elements in connecting the content of the three cards.

Point 3 : S describes most of the details of the cards, but fails in connecting the incidences of the three cards.

Point 2 : S describes fewer details of the cards and is unable to connect the contents.

Point 1 : S only names the objects in the pictures.

(c) Vocabulary : Vocabulary was assessed on a five-point scale.

Point 5 : Varieties of words used, some unusual words are also used which are not heard in day-to-day language from a seven-year old child.

Point 4 : S uses varieties of words but does not use unusual words.

Point 3 : Average vocabulary of a seven-year old. S knows names of the objects in the picture cards.

Point 2 : Does not know the correct names for some of the objects in the picture cards.

Point 1 : Very limited vocabulary. Knows name of only a few of the objects

(d) Grammar : The five-point scale used in assessing the grammatical structure of the sentence was as follows :

Point 5 : Multiple complex sentences are used which have proper placement of words and a good syntactical structure.

Point 4 : Fewer complex sentences (i.e. compound sentences) are used

Point 3 : Simple and correct sentences are used.

Point 2 : Some sentences are incomplete and short but they do convey meaning.

Point 1 : Two-word sentences and single words are used.

(d) Fluency : Fluency refers to child's ability to narrate stories without hesitation and stops in-between words and sentences.

Point 5 : S tells the story without stopping. There is no repetition or hesitation.

Point 4 : In narrating the story S shows some hesitation and also stops once or twice.

Point 3 : S stops after describing one card, occasionally also stops after speaking two/three sentences.

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Point 2 : S stops in-between sentences. Description of a card is done with stops. There is also hesitation in speaking.

Point 1 : There are one-word or two-word responses to the cards and S stops almost after each word. S also shows great hesitation in expressing his/her thoughts.

Visual Sequential Memory

Five one-inch wooden square cubes were put in a line with two inch space in-between. E tapped on the cubes in a specific order. S was asked to tap exactly in the same manner as E. The number of cubes tapped and the level of difficulty increased sequentially. The number of items passed gave the score obtained by S.

Verbal Sequential Memory

Spencer Sentence Memory Test was adopted for Bengali language. Length of the sentences and the complexity of the sentences were kept constant. First a pilot study was conducted on Class II and III children for testing the validity of the test. Both the groups showed significant difference in the mean scores. On this test S obtained the raw score which got transferred into the mental age. On account of the non-availability of Indian norms American norms were used in converting the raw score into the mental age.

Visual Motor Coordination

Visual Motor Integration Test (vmt) was used to assess fine visual motor coordination. The test required S to copy number of geometrical figures. The number of items passed gave a raw score which got converted into the age score. On account of the non-availability of Indian norms American norms were used in converting the raw score into the age score.

Auditory Discrimination

Wepman's Auditory Discrimination Test was adopted for Bengali language. In this test S obtained an error score, i.e. number of errors committed in identifying whether the spoken pair of words was the same or not.

Minor Neurological Signs Survey

This checklist used in the present research was developed at the Children's Hospital, Boston, USA.

Sample

The sample was selected from the two schools of Visva-Bharati, Patha-Bhavan and Shiksha-Satra. Patha-Bhavan is residential as well as non-residential. The non-residential students were mostly the children of Visva-Bharati staff. The residential children were generally from cities. Shiksha-Satra is a school for children of villages around that area. Some of the staff members, particularly of Sriniketan (village institute), also send their children there. The sample consisted of 47 children from Class II (25 from Shiksha-Satra and 22 from Patha-Bhavan). There were 12 good learners (6 boys and 6 girls) and 13 poor learners (6 boys and 7 girls) in the Shiksha-Satra group. In the Patha-Bhavan group there were 12 good learners (8 boys and 4 girls) and 10 poor learners (7 boys and 3 girls). The children were between the ages of 6 years 7 months and 8 years 1 month.

The poor and good learner groups of Patha-Bhavan were matched for their age and socio-economic background. So were the good and poor learner groups of Shiksha-Satra. However, Patha-Bhavan and Shiksha-Satra children were matched for the age but not for their socio-economic and parents' educational background. Approximately 75 per cent of the mothers of the Shiksha-Satra children have only primary education, while approximately 75 per cent of the mothers of Patha-Bhavan children have education up to Secondary Final or B.A. Similarly educational level of the fathers was also higher for the Patha-Bhavan children. There were 10 children of Patha-Bhavan whose fathers had postgraduate degrees while there was not a single child from Shiksha-Satra whose father had studied up to that level. There were only 20 per cent fathers of Patha-Bhavan children who had studied up to Matric, while 50 per cent fathers of Shiksha-Satra children had studied up to Matric or Secondary Final level. This shows that the children of Shiksha-Satra and Patha-Bhavan schools were not matched for the educational background of their parents.

Procedure for Sample Selection

Teachers' grading in Bengali language for all the Class II children

was obtained on the basis of which good and poor learner groups were selected. Those children obtaining the grades A, B, and C+ were considered as good learners, and those obtaining the grades D+, D, and E as learners. Information about each of these children—their birthdates, poor mother tongue, past-educational experiences, their parents' education and professions—was obtained from the school register. On the basis of this information children with Bengali as mother tongue and also those born in the late 70, 71 and the early 72 were selected. After this an attempt was made to match the educational and professional background of the parents of 'good' and 'poor' learner groups children. The children who could not be matched were dropped from the sample.

Procedure

The data collection was done in four sessions. Children were tested individually in their schools. In each session specific tests were administered. The order of tests was as follows : Session I : Raven's Coloured Progressive Matrices Test ; Session II : Block Design, Object Assembly and Sentence Memory Test ; Session III : Minor Neurological Signs Survey, Auditory Discrimination Test, Visual Motor Integration Test (VMI) ; Session IV : Picture Word Articulation Test (Picture-naming Test), Story-telling Test, Piagetian Test and Visual Sequential Memory Test. Only after administering the tests of Session I on all the children, tests of Session II were administered. Similarly, Session III began only after completing Session II, and so on. This procedure was followed to minimize the possibility of communication between children. Unfortunately, Shiksha-Satra children went on vacation after the third testing session, hence the researcher visited the homes of these children and tested them either in their homes or brought them to the school for testing.

Results

The results showed that the poor and good learner groups of Shiksha-Satra and of Patha-Bhavan were matched on their intelligence and also on the age. The results also partially support the hypothesis that the poor and good learner groups of Shiksha-Satra and of Patha-Bhavan will show difference in the development of the constitutional factors.

*Comparison of Poor and Good Learner Groups of
Shiksha-Satra Children*

The mean score of poor learner group on the tests assessing visual perceptual organization, i.e. on block design (10.307) and on object assembly (9.331) was significantly poorer than the mean score of good learner group on block design (12.545, $t(23) = 2.138$, $p < .05$) as well as on object assembly (11.2, $t(21) = 1.848$, $p < .05$)

Comparison of performance on the two tests used to assess expressive language showed that while naming pictures poor learners committed significantly more errors (mean score=15) than the good learner group (mean score=11, $t(22) = 1.782$, $p < .05$). However, when their one-word naming capacity was compared looking into the mean number of items passed, the difference in the score was significant only at .10 level. The difference between the poor learner and the good learner group in their vocabulary, fluency, continuity of thought and grammatical structure of the sentences in the story-telling test were not statistically significant

On the other tests, namely, visual motor integration test, auditory discrimination test, minor neurological signs survey, the verbal and visual sequential memory test, the differences in the scores of the poor and of good learner group was not statistically significant.

*Comparison of Poor and Good Learner Groups of
Patha-Bhavan Children*

The results show that the poor learners' development in expressive language at the one-word and full-sentence level was significantly poorer than the good learners. One-word naming capacity assessed by the picture word articulation test showed that the mean number of the pictures named (37) was significantly lesser than the mean number of pictures named (41) by the good learners ($t(19) = 2.698$, $p < .05$) and they also committed significantly greater errors (12.6) than the good learners (8.45) while naming pictures ($t(19) = 1.969$, $p < .05$).

In the story-telling test also, a significantly greater number of poor learners had scored below the average level while a significantly greater number of good learner group children had scored above the average level. This is true for all the four aspects for which the stories were assessed, i.e. continuity in thought, grammatical structures of the sentences, vocabulary and fluency in expression. The differences were significant at .05 level (see Table 1).

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TABLE 1

RELATIONSHIP BETWEEN SUCCESS IN LEARNING AND PERFORMANCE ON STORY-TELLING TEST ASSESSING EXPRESSIVE LANGUAGE DEVELOPMENT AT FULL-SENTENCE LEVEL FOR SHIKSHA-SATRA AND FOR PATHA-BHAVAN CHILDREN

	Continuity in Thought		Grammar		Vocabulary		Fluency	
	Below Ave- rage	Above Ave- rage	Below Ave- rage	Above Ave- rage	Below Ave- rage	Above Ave- rage	Below Ave- rage	Above Ave- rage
Shiksha-Satra								
Groups :								
Poor Learners	7	1	9	0	9	1	2	4
Good Learners	4	4	7	3	4	4	0	9
χ^2	2.618		2.314		2.130		3.214	
Patha-Bhavan								
Groups :								
Poor Learners	5	2	5	1	5	1	2	5
Good Learners	0	9	0	11	0	9	0	9
χ^2	7.596*		12.986*		11.25*		4.2*	

* $P < .05$

In other areas of development, namely, visual perceptual development tests (block design and object assembly), VMI, verbal and visual sequential memory test, auditory discrimination test and on minor neurological signs survey no differences were found between the children of the two groups.

Comparison of Shiksha-Satra and Patha-Bhavan Children

The mean percentile scores on intelligence test, i.e. on Raven's Coloured Progressive Matrices Test for Patha-Bhavan children (43) was significantly higher than the mean percentile score for Shiksha-Satra children (28; $t(44)_{sig} 2.289$, $p < .05$). However, it could not be concluded that Patha-Bhavan children were brighter than Shiksha-Satra children because on Piagetian tests the children from the two schools did not show any difference in their cognitive development. The figures in Table 2 show that the proportion of Ss at different stages of cognitive development are the same for the children of Patha-Bhavan and Shiksha-Satra.

TABLE 2

COMPARISON OF SHIKSHA-SATRA AND PATHA-BHAVAN CHILDREN
ON THEIR COGNITIVE DEVELOPMENT ASSESSED BY PIAGETIAN
TESTS—SERIATION AND CLASSIFICATION

	<i>In Seriation Test</i>				<i>In Classification Test</i>			
	<i>IIA</i>	<i>IIB</i>	<i>IIB/III</i>	<i>III</i>	<i>IIA</i>	<i>IIB</i>	<i>IIB/III</i>	<i>III</i>
Shiksh-Satra Group	1	6	5	12	12	11	0	1
Patha-Bhavan Group	0	5	0	16	11	9	0	2

In general Shiksha-Satra children showed significantly poorer development in expressive language at the full-sentence level and visual perceptual organization as assessed by object assembly test as compared to Patha-Bhavan children. On picture-naming test, i.e. on the test assessing expressive language at the one-word level, Shiksha-Satra children had passed fewer items and had committed greater errors than the Patha-Bhavan children, however, the difference was not significant at .05 level. Spoken stories were assessed for continuity of thought, vocabulary, grammar and fluency. A significantly greater number of Shiksha-Satra children obtained the below-average ratings on all the above four variables compared to Patha-Bhavan children, while a significantly higher number of Patha-Bhavan children obtained the above-average score on all the four variables. The χ^2 was significant at .05 level (Table 3).

TABLE 3

COMPARISON OF THE PERFORMANCE OF SHIKSHA-SATRA AND
PATHA-BHAVAN CHILDREN ON STORY-TELLING TEST ASSESS-
ING EXPRESSIVE LANGUAGE AT FULL-SENTENCE LEVEL

	<i>Continuity in Thought</i>		<i>Grammar</i>		<i>Vocabulary</i>		<i>Fluency</i>	
	<i>Below Ave- rage</i>	<i>Above Ave- rage</i>	<i>Below Ave- rage</i>	<i>Above Ave- rage</i>	<i>Below Ave- rage</i>	<i>Above Ave- rage</i>	<i>Below Ave- rage</i>	<i>Above Ave- rage</i>
Shiksha-Satra	11	6	13	4	12	7	10	9
Patha-Bhavan	5	15	5	16	5	14	3	18
χ^2	5.90*		8.444*		3.831*		4.534*	

* $P < .05$

When the children of the two schools were compared after controlling for learning success, i.e. the poor learning group of Patha-Bhavan with the poor learning group of Shiksha-Satra and the good learning group of Patha-Bhavan with the good learning group of Shiksha-Satra, the results showed significant difference in the visual perceptual development (assessed by block design as well as object assembly) between the poor learner groups of two schools and not between the good learner groups of the two schools. In other words, it was only the poor learners of Shiksha-Satra who showed poor development in visual perceptual area. The difference between the Patha-Bhavan and Shiksha-Satra children at the total group level in the object assembly score was due to the poor learning group of Shiksha-Satra, having poor visual perceptual development. On the other hand, whole of the Shiksha-Satra group showed poorer language development in comparison to Patha-Bhavan children.

Differences in the mean scores for Patha-Bhavan and Shiksha-Satra children were not statistically significant for the following tests : visual motor integration test, minor neurological signs survey, auditory discrimination test, verbal sequential memory test, visual sequential memory test and block design (one of the tests assessing perceptual organization).

The hypothesis that Shiksha-Satra and Patha-Bhavan children will show difference in the development of all the constitutional factors studied in this research is partially supported as the differences were found only in the development of expressive language and in visual perceptual organization and not in other areas.

Discussion

The results revealed that the poor and good learner groups showed significant difference in their scores on tests assessing language and visual perceptual development, on rest of the tests assessing other functions, namely, visual motor coordination, minor neurological signs, verbal and visual sequential memory and auditory discrimination no differences were found between the good and the poor learner groups.

In case of Patha-Bhavan children it was the poor language development which seemed to be related to learning difficulties while in the case of Shiksha-Satra children the poor learners showed delay in development of verbal as well as visual perceptual functions, as they had scored

significantly poorly on two of the tests assessing visual perceptual organization

The above observation indicates that learning difficulties are associated with poor language development. This is shown by the fact that the poor learning group of Patha-Bhavan had poorer language development than that of the good learning group. The poor learning group of Shiksha-Satra did not show poorer language development as compared to the good learning group. However, all of Shiksha-Satra children showed poor language development in comparison to Patha-Bhavan children

The poor and good learner groups of Shiksha-Satra showed difference in the development of visual perceptual functions, but the difference in visual development was not found among either of the groups of Patha-Bhavan. Thus it can be concluded that poor perceptual development in itself does not lead to learning difficulties; it is certainly not a primary factor leading to learning difficulty.

The reason for poor visual perceptual development (in addition to poor language development) among poor learner group of Shiksha-Satra is that these children may be having general delay in the development of left as well as right hemisphere functions—verbal as well as visual. Shiksha-Satra children, in general, come from the poorer section of the society where there is a higher chance for poor pre-natal and post-natal care and malnutrition—in terms of calories as well as protein deficiency. All or even one of the above-mentioned factors can delay the development of the child. Unfortunately the data on the indicators of malnutrition and delay in the development, i.e. height, weight and the head circumference of the child was not collected for practical reasons.

This raises the question. Why is poor language development a primary factor leading to learning difficulties and not poor visual development?

Verbal information is processed in the left hemisphere of the brain and visual information in the right hemisphere. Reading is a verbal task so is the acquisition of languages. Any difficulty in the development of left hemisphere can cause difficulties in language as well as reading. Thus one finds that it is the poor language development which is primarily associated with learning difficulties and not poor visual perceptual development.

The results have shown that Patha-Bhavan children have significantly better language development than the children of Shiksha-Satra. In one of the tests of visual perceptual development, object assembly, Patha-Bhavan children have also performed significantly better. This

raises the question why should there be a difference in the visual as well as verbal development among the children of two schools? There are the following three possible explanations.

1. There is a biological base to the problem. In other words the Shiksha-Satra children have the assumed adverse conditions, i.e. poor pre-natal and post-natal care and also malnutrition, which has led to delay in the development of their brains resulting into delayed or deficient development in different functions.

2. The basis is environmental. Poor language development is highly correlated to low socio-economic background. The child from the low socio-economic group has lesser environmental input, e.g. opportunity to learn through books and verbal exchange between the parents and the child. Some of the children from Shiksha-Satra who obtained above-average ratings on some of the variables of the story-telling test, grammar and vocabulary, are the children whose mothers have some education and fathers have college education.

There are two studies (Sharma 1971 and Ghuman 1975) which have shown that scores on performance tests of wisc and Raven's is affected by the environmental factors. Sharma compared white boys and Indian boys living in England for a long period: He found no difference in their scores on block design. Ghuman compared white and Punjabi boys. Among Punjabis there were two groups: Those who were living in England, called English Punjabis and those living in India called Indian Punjabis. (The two groups of Punjabi were matched on their socio-economic and cultural background and their native village is also the same.) He found no difference between the white and English Punjabi boys on performance sub-tests of wisc and Raven's, but the Indian Punjabis and English Punjabis showed difference on these tests. However, the English and Indian Punjabis did not show any difference on Piagetian tests on conservation of weight. Indian Punjabi boys were engaged in farming so they had experience in measuring, sorting, weighing, but they had no experience which would help them in their spatial ability, i.e. the ability required to do well on Raven's and performance section of wisc. Thus it can be argued that the differences between Patha-Bhavan and Shiksha-Satra children are due to differences in socio-cultural factors.

3. There is a biological as well as environmental base. The child is born with poor physiological conditions. The adverse environmental conditions add to the problem and the child ends up showing poor development in number of areas.

Conclusions

Poor expressive language development and poor visual perceptual development (perceptual organization) are found to relate to learning difficulties. But the poor language development is a primary factor leading to learning failure.

For the children coming from the middle and upper-middle class and cities learning failure is associated with poor language development. While for the children from low and middle socio-economic groups and villages, in addition to poor language development, poor visual perceptual development is also found to relate to learning difficulties.

Children having learning difficulties do show adequate development in visual motor coordination, verbal and visual sequential memory, and auditory discrimination and show absence of 'soft signs'.

Children from different socio-economic and parental educational background show differences in expressive language development, visual perceptual organization and intelligence when assessed by Raven's test and not when assessed by Piagetian tests.

However, it should be stated that the above conclusions should not be taken as final and cannot be generalized for the following reasons : (a) Some of the tests used in the present research are not properly standardized, in spite of this the researcher had to use them as no other tests in Bengali were available. (b) The size of the sample for this study is rather small. (c) The poor and good learning groups of Patha-Bhavan were not properly matched on their socio-economic background.

Implications

The results have shown that language development during early years play an important role in learning to read. During the early years of education emphasis should be given for providing opportunities for language development, for instance, providing opportunities for free verbal expression, verbal stimulation by activities such as story-telling, dramatic activities, etc. By suggesting this the researcher is not implying that environmental input is a cure for the child's problem, but environmental input does help in overcoming the problem.

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The Prediction of Creativity

A Study

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The present investigation was an attempt to study prediction of creativity from adjustment, frustration reactions and level of aspiration. The random sampling procedure was used to select 600 male students of classes IX and X. Verbal Test of Creative Thinking by Mehdi, Adjustment Inventory by Sinha and Singh, Frustration Test by Chauhan and Tiwari and Level of Aspiration Test by Shah and Bhargava were used to collect data. Multiple regression equations were established and Rs were calculated. The results show that these predictors do not tend to influence creativity in the same manner, and they do not have significant multiple correlations with creativity except in the case of the team of adjustment, aggression and level of aspiration.

CREATIVITY is mankind's greatest asset. But much of the creative talent goes unrecognized. Therefore, emphasis should be on the studies on prediction of creativity from various correlates to facilitate its early identification, conservation and cultivation.

A survey of related literature revealed that Mackinnon (1962), Parloff and Datta (1965), Hinton (1966), Raychaudhuri (1966), Foster (1968), Mishra (1969), Turner (1962), Nair (1975), Frost (1976), Dharmagadan (1976), Mallappa and Upadhyaya (1977), Kandil and Torrance (1978), Sinha and Sharma (1978), Singh and Singh (1979) and Asha (1980), etc. had studied creativity in relation to adjustment, frustration and level of aspiration. Their inconsistent and inconclusive results necessitated the present investigation which was carried out to study

(i) prediction of creativity, i.e. to establish regression equations between creativity as criterion and adjustment, frustration reactions (regression, fixation, resignation and aggression) and level of aspiration as predictors, and (ii) the relationship between creativity and teams of its predictors, i.e. adjustment, frustration reactions (regression, fixation, resignation and aggression) and level of aspiration.

Method

Sample

Random sampling procedure was used to select 600 male students of Classes IX and X from scientific and literary groups of the the secondary schools of Agra city.

Tools

1. The verbal test of creative thinking developed by Mehdi (1973) was used to identify creative students. This test includes tasks pertaining to fluency, flexibility and originality. It consists of four sub-tests, namely, consequence test, unusual, uses test, similarity test and product improvement test.

2. The adjustment inventory for school students prepared by Sinha and Singh (1972) was administered to measure adjustment. It consists of 60 'yes-no' type items and provides three separate measures of adjustment (emotional, social and educational) as well as total adjustment.

3. The frustration test prepared by Chauhan and Tiwari (1972) on the lines of Dollard and Shaffer was used to measure frustration reactions. The scale consists of 40 items out of which each of the four reactions (regression, fixation, resignation and aggression) has 10 items. Each item has five answers graded on a five-point scale on the positive dimension and a zero point on the negative dimension.

4. The level of aspiration test developed by Shah and Bhargava (1972) on the lines of Underwood was used to measure the level of aspiration. This test consists of 50 circles of 1 cm. in diameter. The subjects were asked to draw four lines in each circle so that it might appear as a human face. The time given for each trial was 30 seconds. This test provides three types of scores including the goal discrepancy score.

Procedure

The investigator administered and scored the tools according to instructions provided in their manuals. The scoring of the creativity test was done with the help of scoring guide prepared by the author. The raw scores were converted into standard scores with mean of 50 and SD 10 to get the total creativity score for each item. Scores 1 SD above the mean and 1 SD below the mean were used to mark high and low creative groups, respectively. Scores approaching the mean were used to mark the average group. For convenience in calculation, only 100 students selected on the above basis were put in each group.

Results and Discussion

The prediction of creativity from adjustment, frustration reactions and the level of aspiration can be estimated from the regression equations obtained in the score from.

MULTIPLE REGRESSION EQUATION 1

Criterion		Predictors		
Creativity X_1	Adjustment X_2	Regression X_{3_1}	Level of Aspiration X_4	Constant
X_1	0.638 X_2	-0.483 X_{3_1}	+3.93 X_4	+169.76

It is clear from Equation 1 that regression coefficients for adjustment and level of aspiration are positive whereas regression coefficient for regression is negative. It means that these predictors do not influence creativity in the same manner. All these regression coefficients are significant at .05 level. It implies that one unit increment in adjustment causes only 0.638 unit increment in creativity. Thus, adjustment tends to promote creativity. But the degree of increment is low.

One unit increment in level of aspiration causes increment of 3.93 units in creativity. It suggests that the level of aspiration is likely to raise creativity. But its total contribution to creativity in this situation is not much because of its low mean value (1.20). The

THE PREDICTION OF CREATIVITY

significant negative regression coefficient for regression indicates that one unit increment in regression causes 0.483 unit decrement in creativity. Thus, regression is likely to hamper creativity. But its amount is low.

MULTIPLE REGRESSION EQUATION 2

Criterion		Predictors			
Creativity X_1	Adjustment X_2	Fixation X_{3_2}	Level of Aspiration X_4	Constant	
X_1	0.642 X_2	-0.834 X_{3_2}	13.66 X_4	1176.73	

Equation 2 shows that all these regression coefficients are significant at .05 level. Regression coefficients for adjustment and the level of aspiration are positive while regression coefficient for fixation is negative. It means that these predictors do not affect creativity in the same way. The significant positive coefficient for adjustment implies that one unit increment in it yields only 0.642 unit increment in creativity. It confirms the previous finding about the role of adjustment in creativity.

The significant positive coefficient for level of aspiration indicates that one unit increment in it causes 3.66 unit increment in creativity. It confirms that the level of aspiration tends to raise creativity but its total contribution is low due to its low mean value (1.20). The significant negative coefficient for fixation causes decrement of 0.834 unit in creativity. It gives an indication of the small negative influence of fixation on creativity.

MULTIPLE REGRESSION EQUATION 3

Criterion		Predictors			
Creativity X_1	Adjustment X_2	Resignation X_{3_3}	Level of Aspiration X_4	Constant	
X_1	0.656 X_2	-0.342 X_{3_3}	11.83 X_4	+166.54	

It is evident from Equation 3 that all these regression coefficients are significant at .05 level. Regression coefficients for adjustment and level of aspiration are positive whereas regression coefficient for resignation is negative. It means that these predicting variables do not influence creativity in the same manner. The significant positive coefficient for adjustment implies that one unit increment in it yields only 0.656 unit increment in creativity. It confirms the previous findings about the role of adjustment in creativity.

The significant positive coefficient for level of aspiration indicates that one unit increment in it causes 1.83 unit increment in creativity. It seconds the previous findings about the positive role of the level of aspiration in creativity.

The significant negative coefficient for resignation means that one unit increment in resignation causes decrement of 0.342 unit in creativity. It indicates small negative influence of resignation on creativity.

MULTIPLE REGRESSION EQUATION 4

Criterion		Predictors		
Creativity X_1	Adjustment X_2	Aggression X_{34}	Level of Aspiration X_4	Constant
\bar{X}_1	0.622 X_2	+0.54 X_{34}	+5.00 X_4	+138.32

Equation 4 shows that all these regression coefficients are significant at .05 level. Coefficients for adjustment, aggression and the level of aspiration are positive. It means that these predictors in this situation influence creativity in the same manner. The significant positive coefficient for adjustment implies that one unit increment in it yields 0.622 unit increment in creativity. It confirms the previous findings about the role of adjustment in creativity.

The significant positive coefficient for aggression shows that one unit increment in it causes 0.54 unit increment in creativity. It indicates small positive influence of aggression on creativity. The significant positive coefficient for the level of aspiration means that one unit increment in it causes 5.00 units increment in creativity. It seems that the level of aspiration raises creativity but its total contribution is not much due to its low mean value (1.20).

MULTIPLE CORRELATIONS

S. No.	Criterion variable	Predictors	R
1.	Creativity	Adjustment, Regression and Level of Aspiration	0.103
2.	Creativity	Adjustment, Fixation and Level of Aspiration	0.103
3.	Creativity	Adjustment, Resignation and Level of Aspiration	0.112
4.	Creativity	Adjustment, Aggression and Level of Aspiration	0.124*

* Significant at .05 level

The Rs between creativity and teams of adjustment, regression and level of aspiration, adjustment, fixation and level of aspiration and adjustment, resignation and level of aspiration are non-significant. It seems that they form weak teams and do not have significant collective influence on creativity. The R between creativity and the teams of adjustment, aggression and level of aspiration is significant at .05 level. The value of coefficient of multiple determination (R^2) is 0.0153376. It means that only 1.5 per cent variance in creativity is accountable by the variance in the group of these predictors. It implies that they form a team which tends to promote creativity. But its amount is low.

Conclusions

1. The predictors, i.e. adjustment, frustration reactions and level of aspiration do not influence the criterion variable, i. e. creativity in the same manner. Their regression coefficients are not equal in value.
2. The teams of these predictors do not have significant multiple correlations with creativity except in the case of the team of adjustment aggression and level of aspiration.
3. Adjustment, frustration reactions and the level of aspiration are not potent predictors of creativity.

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Internal Assessment in Relation to External Marks of B.A. (Hons.) Students of Utkal University

A Statistical Study

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EXAMINATIONS are the predominating force in our educational system. According to the Indian University Commission (1902), in India the teaching was subordinated to examinations and not examinations to teaching. The traditional system of examinations which is written and external in nature, have been subjected to severe criticism from all the quarters, viz. the educational administrators, the teachers, the pupil-teachers and the public. The crippling effect of external examinations on the quality of work in higher education is so great that examination reform has become crucial to all progress. Referring to these crippling effects of the present examination system, the Radhakrishnan University Education Commission observed : We are convinced that if we are to suggest any single reform in university education it should be that of examinations.

Dissatisfaction with the existing system has been so great that educationists even advocated the abolition of external examinations. The examinations are alleged to hamper syllabus, to discourage imaginative teaching and to frustrate the child who can keep pace with the requirements of the prescription. But we cannot do away with external examinations altogether, as it also measures some significant abilities which cannot be tested adequately by other techniques of evaluation. Hence

it was considered essential to strengthen and bring reforms by introducing internal assessment as one of the suitable measures of examination reform. Though internal assessment has been introduced in a number of universities yet due to the lack of scientific tools for evaluating the attainment its role has been criticized all over the country in spite of its manifold advantages.

Out of the innumerable problems of Indian examinations a few are more important and need urgent reforms and the top-most priority in research projects. The safeguards for smooth sailing of internal assessment need to be probed and offer a vast scope for study and research. In this context the researchers were inspired to conduct an exploratory study on the efficacy of internal assessment against external marks in the graduation level of Utkal University. The results will help in improving assessment procedures which will in turn bring about an improvement in the methods of teaching and learning.

Objectives

1. To see if there was any significant relationship between the internal assessment and external marks awarded in various subjects of honours classes.
2. To study the relationship of internal assessment with different colleges.
3. To compare the mean internal assessment scores of students at the upper and lower levels of external marks and at two types of institutions, viz. government and private, in various subjects.

Methodology

The study pertains to B.A. (Hons.) course of Utkal University. The honours course of this university is of two years. One honours student has to offer two compulsory subjects, viz. English, carrying 200 marks, Modern Indian Language (MIL) carrying 100 marks, one pass subject out of several options carrying 100 marks and one honours subject out of several options carrying 600 marks. Thus there are three compulsory papers, three pass papers and six honours papers, each carrying 100 marks. Out of the total 100 marks in each paper, 25 marks are assigned for internal assessment and the rest 75 marks for external examinations. All the colleges assign internal marks taking the average

of best six out of eight tests which they hold during the two years. All the colleges give both essay and objective type tests. The duration of the test is three hours. The number of questions to be attempted are usually five out of eight to ten. The Utkal University introduced internal assessment in 1971 in its various levels of examinations.

The population for the present investigation included B.A. (Hons.) students in all colleges affiliated to Utkal University during the years 1976-78. Only ten colleges were selected randomly out of 72 colleges affiliated to this university for the session 1976-78. Again, it was not possible to take all the honours students of different subjects of the selected colleges for the present study. So only two honours subjects, viz. economics and political science and two compulsory papers of languages were selected in this problem. Thus all the candidates who had offered economics and political science as their honours subjects and appeared in B.A. (Hons.) examination in April-May 1978 were taken up for the study. In total 544 students from government and private colleges were selected for analysis.

Analysis

The analysis of data has been presented in the following four sections, A, B, C, and D.

Section A

For the first objective, there were ten colleges and four subjects of these colleges were taken up for the study. In order to see the relationship between internal assessment and external marks for different colleges in four subjects, the correlation coefficient was computed. Further, the overall relationship between internal assessment and external marks in various subjects was also studied through Pearson product moment method. Results are shown in Tables 1 and 2.

Section B

In this section subjects were assigned divisions on the basis of their internal scores. The scores on internal assignment were dichotomized into three categories: Students securing more than 60 per cent, more than 50 per cent and more than 36 per cent were all considered in the category of I, II and III division. As there were ten colleges ten cate-

TABLE 1

SUMMARY OF RESULTS OF PRODUCT MOMENT COEFFICIENT OF CORRELATION BETWEEN INTERNAL ASSESSMENT AND EXTERNAL MARKS, COLLEGEWISE AND SUBJECTWISE

Sr No.	Name of the College	Subjects				N
		English	MIL	Hons.	Pass	
1.	Ravenshaw College	.43**	.46**	.64	.36	96
2.	R.B.B College	.67**	.59**	.20	.45	96
3	R.D. Women's College	.60**	.25**	.46	.69	64
4.	S.C.S College	.37**	.35**	.14	.25	64
5.	Kendrapara College	.61**	.45**	.61	.07	64
6.	Salipur College	.33	.20	.69	.81	32
7	S B.W. College	.79**	.34	.62	.40	32
8.	S.V.M. College	.78**	.88**	.68	.74	32
9	Christ College	.42**	.43*	.55	.43	32
10.	Women's College, Puri	.78**	.48**	.05	.49	32

** Significant at .01 level

* Significant at .05 level

Others are not significant at .05 level

TABLE 2

SUMMARY OF RESULTS OF PRODUCT MOMENT COEFFICIENT OF CORRELATION BETWEEN INTERNAL ASSESSMENT AND EXTERNAL MARKS SUBJECTWISE

Subject	Correlation	N
English	.53**	544
MIL	.40**	544
Honours	.37**	544
Pass	.41**	544

** Significant .01 level

gories were made taking each college as an independent variable. Hence, the design of the study for chi-square is 10×3 contingency table. Same design for all the four subjects was used separately and the values obtained are shown in Table 3.

INTERNAL ASSESSMENT AND EXTERNAL MARKS

TABLE 3

**SUMMARY OF RESULTS OF CHI-SQUARE TEST OF INDEPENDENCE
BETWEEN INTERNAL ASSESSMENT MARKS AND COLLEGES**

<i>Subject</i>	<i>Chi-Square</i>	<i>df</i>	<i>Significance</i>
English	172.80	18	.01 level
MIL	255.45	18	.01 level
Honours	187.36	18	.01 level
Pass	178.52	18	.01 level

Section C

To realize the third objective the two-way analysis of variance was used for the analysis of data to compare the mean internal assessment scores of students at the upper and lower levels of external marks at two types of institutions in various subjects. Thus there were three variables, viz. internal assessment scores which are considered as dependent variable, types of institutions and external marks as independent variables, each having two levels. For the case of computations, it was decided to retain 50 replications in each cell by rejecting the excess randomly. For this purpose, 200 replications in all were selected out of 544 on the basis of the levels of independent variables for each subject separately. Results for this portion are shown in Table 4.

TABLE 4

SUMMARY OF RESULTS OF ANALYSIS OF VARIANCE

<i>Subject</i>	<i>Source of Variance</i>	<i>F</i>	<i>Significance</i>
English	External Marks	95.02	.01 level
	Institutions	20.73	.01 level
	External Marks × Institutions	1.00	NS
MIL	External Marks	88.52	.01 level
	Institutions	10.50	.01 level
	External Marks × Institutions	1.32	NS
Honours	External Marks	15.09	.01 level
	Institutions	10.79	.01 level
	External Marks × Institutions	1.00	NS
Pass	External Marks	60.46	.01 level
	Institutions	6.39	.01 level
	External Marks × Institutions	0.00	NS

Section D

In order to see the relationship between internal assessment marks and external marks, subject-wise for various colleges, the means and mean percentages were calculated. The values obtained are reported in Table 5.

Discussion

For the results of Section A, the correlation coefficient in English for different colleges ranges from .33 to .79. Following the variance method of interpretation, it can be said that the degree of association between the internal assessment and external marks ranges from 11 to 62 per cent. Similarly, the correlation coefficient in MIL for different colleges ranges from .20 to .88 and the degree of association in MIL ranges from 4 per cent to 77 per cent. In honours, correlation ranges from .05 to .69 and the degree of association ranges from zero to 48 per cent. In pass the correlation ranges from .07 to .81 and the degree of association ranges from 0 to 66 per cent. But the overall degree of association between internal assessment and external marks in English, MIL, honours and pass are 28, 16, 14 and 17 per cent, respectively. The overall relationship between internal and external marks for different marks was substantial correlation in English, MIL and pass but a low correlation was found in the honours course. The results fall in line with those of Kamat (1966), Reddy (1975), Dhaliwal and Singh (1976), who found the correlation between internal assessment and external marks in arts and literary subjects ranging from .20 to .65.

In Section B, the chi-square value came to be significant for all the subjects of different colleges on internal assessment scores. It revealed that there is evidence of association between subjects and colleges. In other words, internal assessment in different subjects and colleges are related or dependent. It may be further inferred that there are significant differences in the colleges in award of I, II and III division in internal assessment of their students in different subjects.

For Section C, it was found through analysis of variance that the government colleges differed significantly in the award of internal assessment from private colleges in all the four subjects. The mean internal score of the government colleges was significantly higher than the mean of the private colleges. The results further revealed that the mean internal assessment scores at the upper and lower levels of external

TABLE 5

THE MEAN AND MEAN PERCENTAGE FOR INTERNAL AND EXTERNAL EXAMINATIONS IN
DIFFERENT SUBJECTS

Sr. Name of the College No.	Mean Internal Score			Assessment Mean Percentage			Mean Score of External Marks			Mean Percentage						
	English	MIL	Hons.	Pass	Eng.	MIL	Hons.	Pass	Eng.	MIL	Hons.	Pass				
1. Ravenshaw College	27.94	14.26	98.25	45.69	56	57	66	61	74.12	32.49	248.57	121.60	49	43	55	54
2. B.J.B. College	28.83	14.98	113.36	52.52	58	60	76	70	66.06	35.46	239.72	120.29	44	47	53	53
3. R.D.W. College	27.83	13.47	108.61	51.34	56	54	72	68	63.41	33.61	214.69	107.70	42	45	48	48
4. S.C.S. College	26.61	13.89	102.09	50.66	53	56	68	68	59.89	40.64	221.09	120.22	40	54	49	53
5. Kendrapara College	26.02	13.91	103.16	47.22	52	56	69	63	59.30	34.28	204.41	120.17	40	46	45	53
6. Salipura College	26.81	13.59	93.75	49.50	54	54	63	66	56.31	26.97	201.47	116.59	38	36	45	52
7. B.B.W. College	28.00	14.50	86.91	46.72	56	58	58	62	64.53	36.41	208.47	121.50	43	49	46	54
8. S.V.M. College	27.31	14.72	94.69	50.41	55	59	63	67	62.93	37.28	209.25	125.44	42	50	47	56
9. Christ College	24.50	11.69	83.25	38.25	49	47	56	51	56.93	32.34	211.47	97.56	38	43	47	43
10. W. College, Puri	23.16	13.69	93.31	46.99	46	55	62	63	59.62	34.31	220.28	119.62	40	46	46	53

marks differ significantly in all the four subjects. It means that the students scoring high in external marks scored high in internal assessment and the students scoring low in external marks scored low in internal assessment. Scores of students in internal assessment marks is higher than in external examination marks in all the colleges. Hence the mean percentage of internal assessment score is also higher than the mean percentage of external marks of all the subjects in various colleges taken up for study. The mean and mean percentage are shown in Table 5.

The above discussion leads to the conclusion that the awards in the internal assessment are quite fair in B.A. (Hons.) courses of Utkal University. □

Dependency and its Antecedents

A Review

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DEPENDENCY may be defined as "a complex of thoughts, beliefs, feelings and behaviours which revolve around the need to associate closely with, interact with and rely upon valued other people" (Hirschfeld, Klerman, Chodoff, Korchin and Barret 1977. Sinha (1968), terming it as 'dependence proneness', defines it as a "Motivational habit to depend on others when dependency is not necessarily called for". The dominant usage of the term in literature, over the last several years, has placed emphasis upon the child's seeking nearness, attention and approval of adults for his own sake rather than for satisfying other's needs. Most writers, therefore, agree on the following dimensions as constituents of the cluster of behaviours which is labelled as 'dependent' : (i) seeking physical contact, (ii) seeking to be near, (iii) seeking attention, (iv) seeking praise and approval and (v) resisting separation.

Historical Development of the Concept of Dependency

There are three main sources of the concept of interpersonal dependency, as evident in the literature. These are : (i) the psychoanaly-

tic theory of 'object relations', (ii) the ethological theory of 'attachment', (iii) the social learning theory of 'dependency'. The term 'dependency' with its above-mentioned connotations is, however, exclusive to social learning theory (Sears *et al.* 1953, 1957, 1965, Sears 1972, Dollard and Miller 1950, Bandura and Walters 1963, Bandura 1969, Gewirtz 1961). Therefore, it would be relevant to describe the development of the concept in this context only. The origin of the concept of 'dependency' dates back to 1938 when, influenced by Freud's (1938) incompletely developed notions concerning mother-infant relationship, Murray proposed a motivational construct '*n*-succorance'. This was to account for a class of infant behaviours that included crying and pleading for nourishment, love, aid and protection. Freud's emphasis on orality as an important element in the child's motivational system was clearly reflected in Murray's conception, at least with respect to early ontogenesis. Since Murray was also concerned with young adult behaviour, *n*-succorance was by no means limited to oral strivings but referred more broadly to a general need for support, sympathy, love and attention.

Pursuing the same line of reasoning, Whiting (1944) proposed a construct of 'dependency' within the then current Yale framework of learning theory (Miller and Dollard 1941) and frustration or action theory (Dollard, Doob, Miller, Mowrer and Sears 1939). Dependency was viewed by him as an acquired drive for which the primary reinforcements come from feeding and other forms of infant caretaking. Whiting's main emphasis was on dependent behaviour as a reaction to frustration. Sears (1948), also influenced by Whiting's position, focused on the acquired drive as a determinant of learning and a goal-directed action.

Through roughly the first half of this century, therefore, this theory of 'acquired' or 'secondary' drive was generally held to explain the acquisition of all social motivation including dependency. The central feature of this theory was that conditioned and reinforcing stimuli (provided by caretaker appearance and behaviour characteristics) acquire and maintain their value by association with a limited set of apparently unconditioned reinforcing stimuli (in particular, food, water and the removal of noxious stimuli), conventionally thought to reduce 'physiological needs'.

In the past few decades, however, the 'secondary' drive theory has been questioned on at least three grounds :

1. The first point concerns the important role played by species, specific and other seemingly unconditioned S-R patterns in the

- organization, at successive development points of the behaviour systems which connote dependency
2. Secondly, there are findings that seemingly unconditioned reinforcers which are able to control behaviour of the developing infant appear to represent a much wider range than those like food and water that tradition has labelled 'organismically relevant'.
 3. Thirdly, there is a realization that the term 'drive' which is at the core of this formulation has neither provided any clue to the functional relationships involved nor helped to modify or shape changes in the child's behaviour or environment.

These three considerations have provided the basis for attempts to account for the acquisition and maintenance of the behaviour classes connoting dependency, in more functional terms.

Specifically, the social learning theorists refer to dependency as a class or cluster of behaviours, stemming from the infant's initial reliance on the mother. This clustering is determined essentially by the consistency of the reinforcing agent (Sears 1972). Gewirtz (1961) emphasizes that the particular social stimuli which become reinforcing for the child will vary from family to family depending on the nature of mother's responses. Any behaviour of the child that is consistently followed by either primary or conditioned reinforcers will be strengthened, i.e. the probability of its occurrence in the presence of discriminative stimuli will be increased. The strength of the dependency responses will depend first upon the frequency with which they have been reinforced as well as the scheduling of reinforcement, whether the reinforcement is 'time-bound' or 'response-bound'.

Social learning theorists, while encompassing similarities among children that presumably arise from uniformities in their learning experiences, have also focused extensively upon individual differences in dependency responses. According to them, different dependent responses will be strengthened in particular children depending on which of their behaviours parents are most responsive to. The learning theorists concern themselves with explaining why one child is more upset over separation from a parent than others, why one demands more of teacher's attention, and the theorist searches for explanations in the history of each child's interactions with his primary caretakers, the frequency and scheduling of the maternal reinforcements and the contingencies entered into with the child's behaviour.

In recent years some social learning theorists have been emphasizing also the importance of 'modelling' or observational learning' in acquisition of social behaviour. Bandura (1969), applying this stance to development of dependency, observed that difference between his aggressive and inhibited groups of children in 'dependency' in a particular study, were at least in part due to imitative learning. Parents who showed generalized response inhibition or specifically inhibited dependency responses had sons who were themselves non-dependent or expressed dependence only in attenuated forms. This principle of observational learning has, however, been applied to the treatment of dependency only in a limited way.

Antecedents of Dependency

Children of a given age may differ considerably in the intensity and frequency with which they exhibit various types of dependent behaviour. A great deal of research has been undertaken to elicit the factors that underlie these individual differences.

Genetic and Maturational Factors

Developmental variables, and specifically maturational changes have never played a very critical role in social learning models of socialization. Recently, however, more consideration has been given to the possible role of genetic factors. Schaffer and Emerson (1964) have observed among the infants they had studied that some could be identified as 'cuddlers' and others as 'non-cuddlers'. These tended to have siblings too who were similar to them, the cuddliness of the infant did not appear to be related to the mother's customary mode of handling the child. The authors comment :

Thus the avoidance of close physical contact may be interpreted as stemming from a pervasive, innate response tendency which will affect the initial development of social behaviour and which may, in some bases, even be responsible for imposing a considerable strain on the mother-child relationships.

Bell (1968) proposes that person orientation differences are linked to genetic constitutional factors and that these are translated into later differential levels of dependency behaviours. Intraspecific comparisons

in rodents have suggested to some investigators that 'sociability' is a heritable characteristic (Lindzey, Winston and Roberts 1965). Unfortunately, behaviour research with human beings is less clear. As a result, just how much individual difference variance in dependency behaviour can be attributed to genetic or constitutional variables remains unknown.

Other than considering individual differences it can hardly be disputed that maturation-related changes profoundly influence the basic course of social development. Chronological age is strongly associated with the amount, form, direction and type of person-oriented behaviour observed in children as well as in infants. With the development of new skills in self-care, locomotion and object manipulation, the child becomes less bound to the immediate caretaking activities of the adults. The older child is, therefore, realistically, less dependent. Both the child's behaviours and responses to them are further shaped by normative expectations. The social-normative attitudes are themselves maintained because they are more or less congruent with the child's developmental capabilities and response limitations.

Socialization Factors

The term 'socialization' refers in this context to all aspects of child-directed behaviour of parents or other agents who are responsible for teaching the child and caring for it. Over the years there have been extensive investigations of the effects of these aspects or variables on the development of dependency in children.

Socialization and dependency in infancy: Schaffer and Emerson (1964 a) have reported wide individual variations among infants with respect to the age at which specific attachments begin, the number of persons to whom attachments are formed, and the intensity of these attachments. They, however, did not find any significant relationship between intensity of attachment and early nurturance variables like scheduling of feeding, age and duration of weaning, age and severity of toilet training and sheer availability of the mother, measured in terms of frequency and duration. The variables which did bear a significant relationship with intensity of attachment were (a) maternal responsiveness, and (b) amount of maternal interaction, though again not the quality of interaction.

Ainsworth (1963) studied Ganda infants and found that the strength and security of the child's attachment to the mother was not related to her 'warmth' (the amount of affection she expresses) or to scheduling of feeding or to whether she is the exclusive caretaker or not. Yet, the

duration of time the mother devotes in caretaking and other interactions with the child was observed to have a significant bearing on the degree of child's attachment.

Influence of socialization in infancy on later dependency: As evident from the above, the more responsive the mother is to an infant, the greater the social stimulation she provides, the more intensive will be the infant's attachment to her. But the subsequent question arises : would these effects of attachment building experiences in infancy carry over into later years ? Rheingold and Bayley (1959), in a follow-up study of infants, suggest that these effects will not carry over unless conditions that prevailed during infancy are maintained for a considerable time. Efforts have been made to relate infancy experiences to later dependency but in most cases it is not clear whether the infancy experiences represent socialization practices initiated in infancy and maintained into childhood or whether they are discontinuous. Some of the variables investigated in this context are : (i) *Rigid feeding schedules in infancy*—Girls kept on rigid feeding schedules during infancy were found to show higher dependency towards their teachers at the preschool stage (Sears *et al.* 1953, Smith 1958). But boys with a history of rigid feeding schedules demonstrated lower dependency (Sears *et al.* 1975). (ii) *Severity of weaning*—A significant relationship was observed between severity of weaning and high dependency on teachers (Sears *et al.* 1953), low degree of touching, holding, seeking nearness in girls and high degree of total dependency, particularly negative attention-seeking in boys only (Sears *et al.* 1965). Sears *et al.* (1957) also attempted to determine whether mother's responsiveness to infant's crying had any enduring effect. Brief separation of child from mother during infancy was another variable explored (Sears *et al.* 1957, 1965). Both these variables had no effects on later dependency.

The relationships reported above have, however, not been uniformly established across different measures of dependency. It has, therefore, been concluded that a relationship between the infant socialization practices and later dependency has not been adequately demonstrated. (Macoby and Masters 1970).

Childhood socialization and dependency : Efforts to understand the effects of concurrent socialization practices on dependency have focused on certain global dimensions of parental behaviour, particularly the warmth-hostility dimension and the permissiveness-restrictiveness dimension. This has been true partly because factor analysis of measures of parent characteristics have shown that these two dimensions are fairly pervasive and account for variance in other measures. In addition

warmth' has figured centrally as a predictive dimension because it is presumed to represent a cluster of parent behaviours that have theoretical importance in development of dependence.

Parental 'warmth' and dependency: A survey of related studies shows that this global variable 'warmth' has proved to be a poor predictor of dependency. Several research studies carried out on children of varying age-groups have indicated no significant relationship between 'warmth' and dependency (Finney 1961, Cairns 1962, Baumrind and Black 1967, Sears *et al.* 1953, 1957, 1965). A few studies, however, did show some relationship. Siegelman (1966) found a small but significant negative correlation between mother's love and child's dependence in the school setting. Hatfield *et al.* (1967) also reported a positive correlation between maternal warmth and child's independence. Bandura (1960) and Bandura and Walters (1959), on the contrary, have found parental warmth to be associated with high dependency in pre-adolescent boys and high dependency and non-aggressiveness in adolescent boys.

Rejection/hostility and dependency: The polar opposite of 'warmth', that is, rejection or hostility, has also been related to dependency in several studies. Winder and Rau (1962) observed maternal rejection to be associated with dependency and paternal rejection with both dependency and aggression. Sears *et al.* (1957) also found a small, significant correlation between rejection and dependency. Marshall (1961) reported degree of parental 'interpersonal distance' from the child as contributing to high frequency of contact-seeking of teachers among nursery girls. McCord *et al.* (1962) on the basis of some case records of pre-adolescents and adolescents presented evidence of parental rejection leading to greater dependence. Some earlier studies also give empirical support to this direction of relationship (Wittenborn 1956, Smith 1958). Contradictory evidence, however, has also been presented by some studies (Bandura and Walters 1965, Sears *et al.* 1965). These show a negative relation between rejection by parents and dependency in children.

Permissiveness-restrictiveness dimension: It is generally hypothesized that general restrictiveness will prevent the child from acquiring autonomous skills for coping with his needs and will, therefore, be associated with continued high dependence upon parents and other adults. A number of studies support this contention (Watson 1957, Faigin 1958, Winder and Rau 1962, McCord *et al.* 1962, Kagan and Moss 1962, Finney 1963, Murphy 1962, Smith 1958).

McPartland and Epstein (1975) have reported the positive effects

of a few rules and high involvement in the family authority structures on development of independence. Baumrind (1973) distinguishes between authoritarian and authoritative child-rearing and reports the latter as being more positively associated with purposive, dominant and achievement-oriented behaviour in girls and with all indices of social responsibility in boys.

Sturzebecher and Herrmann (1974) presented results which indicate that children from authoritative homes were more inclined to behave in ways demanded and expected by the teacher and the school, while children from less authoritative homes tended to be more responsive to peer models. Donoghue (1975) also found authoritarianism to be negatively related to independence. Positive feelings for the child and encouragement of independence were observed to be conducive to the development of independence. Restrictiveness in parents was again found to be positively related to dependent behaviour. Certain unhypothesized relationships that emerged were : (a) non-allowance for dependence rather than allowance was positively related to independent behaviour, and (b) authoritarian and restrictive attitude of the father led to child withdrawal rather than independence.

Taylor (1976), however, reported no relationship between father control behaviour and child's level of dependency. Singh (1977) studied parental behaviours like restrictiveness-permissiveness, love, rejection, protection, neglect and their relationship with dependency. He found dependency to be positively associated both with extremes of parental protection as well as rejection, but negatively associated with parental love. Parental restrictiveness, permissiveness and neglect were not associated with dependency.

Effects of direct reinforcement on dependency : Studies by Cairns (1962) and Nelson (1960) have presented data which support the contention that reinforcement of dependency behaviour results in an increase in dependency. Another study (McCord *et al.* 1962) has shown that punishment for dependency is negatively associated with total observed dependency. This is also supported by Sears *et al.* (1965). Bandura (1960), on the contrary, asserts on the basis of his empirical data that punishment for dependency decreases the frequency of occurrence of dependency behaviours, directed toward the punishing agent. General parental punitiveness has, however, been found to affect boys and girls differently. It leads to an increase in dependency in boys but decrease in girls (Sears *et al.* 1953, Winder and Rau 1962, Baumrind and Black 1967).

Other family characteristics and dependency : Waldrop and Bell

(1964) reported a significant correlation in their study between family size and density and the degree of child-initiated contact with female teachers in school. Goldstein (1974) compared the sons of working and non-working mothers on dependency and found no significant difference between them. Even the number of siblings and ordinal position did not bear any relationship to dependency. Taylor (1976), however, did find a significant relationship between ordinal position and dependency. Sinha (1968) reported data which indicates that children from upper socio-economic strata, or from upper caste families tended to be more dependent. An only child, or a child from a nuclear family was also more prone to be dependent as compared to a child from a joint family, or one having siblings. Emphasizing the reciprocal nature of parent-child interactions Marcus (1975) found that dependent behaviour in children tended to elicit greater encouragement of independence and non-directiveness in parents. Singh (1976) in a study of adolescents, based on Bandura's theory of observational learning, reported that children of high dependence prone parents tended also to be high on dependence.

A few studies have also indicated sex differences in level of dependency, attributing these to differential child-rearing practices for boys and girls. Girls have generally been found to be more dependent than boys (Golightly, Nelson and Johnson 1970, Ojha and Singh 1972).

It may be concluded, therefore, from a survey of the research studies described above that not many clear-cut, unchallenged relationships are indicated between the child-rearing antecedents studied and level of dependency. More generally, these child-rearing studies have shown that the process by which parents influence their children's behaviour are considerably more complex than was first assumed to be the case.

The learning theorists now emphasize that while considering the antecedents of dependency the variable really relevant would be the contingencies of reinforcement and the precise behaviour being reinforced (Sears 1972, Cairns 1972). They suggest making detailed accounts of the reciprocal interaction sequences between parents and children and tracing developmental shift in interaction patterns. The focus, therefore, is on the specific dyadic interactions and consequent cognitive sets. Social interactions are vulnerable to change, in both the child and non-humans. Prior experience and learned reaction tendencies bias responses so that some dyadic behaviours are more probable than others in a new setting. The extent to which the bias is maintained, however, will be a function of the events that are operative in that

particular context. The same dyadic learning processes that were operative in child-rearing interactions with the parents will continue to be operative in the child's relationship with friends and adults. And some behaviours are self-perpetuating by virtue of the responses they reliably elicit from others.

It may, therefore, be concluded that the focus in any study of the antecedents of dependency should be not so much on the global dimensions of child-rearing, but rather on the details and specifics of the dyadic interactions of the caretaker and the child.

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Testing of Hypotheses Regarding Suitability of Marks Adjustment Models

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The present paper attempts to study the problem of adjustment of marks assigned by different examiners. Some examiners, despite prescribed marking policies, tend to spread marks over the whole marking scale while other squeeze to a narrower range. Thus examinees with equal performance end up with unequal marks because their performance is assessed by different examiners. In the past, a variety of models has been used to adjust marks in such cases. However, it still remains to be studied whether the model under study fits the data or not. This study relates the estimation of adjustment parameters involved in the model with testing of hypotheses regarding suitability of model. The test criterion used is the likelihood ratio test. For a general case of $m (\geq 2)$ examiners, the likelihood ratio tests are derived to test the goodness of the model. In the process of calculating the likelihood ratio test statistics the maximum likelihood estimates of adjustment parameters involved in different models are also obtained. A numerical example is used to test models.

MARKS and marking behaviour of teachers are constant source of concern to educators. Despite prescribed marking policies teachers differ in their marking standards. Some teachers may spread marks over the whole range of marking scale while others squeeze to a narrower range. In such circumstances, students having equal performance can end up with unequal marks because they are marked by different teachers. In the past, several attempts have been made to compensate for marking discrepancies by using a variety of general adjustment parameters (Linn 1966). Lord (1955), Potthoff (1966), and Singh (1975, 1978) consider the problem of estimation of marks equating

parameters and provide procedures for estimating the maximum likelihood estimates (MLE) of marks equating parameters.

Researchers, so far, have focussed their attention only on the problem of estimating marks equating parameters. Despite the long history, the existing volumes of research on the marks equating problem, and availability of the simplest to the complex models, it still remains to be studied whether the model under study fits the data or not. In other words, the related problem of *testing* of hypothesis regarding the suitability of marks equating model has not received any attention. This study addresses itself to the problem of *testing* of hypothesis regarding the suitability of model.

The goodness of fit of the model is tested, in a large sample, using the likelihood ratio technique. In the process of calculating the likelihood ratio test statistic, maximum likelihood estimates of the unknown parameters involved in models are found.

The Study

Consider a situation where a class of N students for whom scores x 's (concomitant variable) on a measure of ability are available, write a common essay examination. Suppose m (>2) examiners are available to evaluate essays using common marking scale and prescribed marking scheme. Let n_i essays be assigned at random to the i^{th} examiner for marking, $i=1, \dots, m$; so that $\sum_{i=1}^m n_i = N$. Assume that marks y 's (criterion) are normally distributed with means which are linear functions of the concomitant variable x , and variance equal to σ^2

Assumption

Assume that under the model the observation

$k_j y_{ij} \sim N(\nu_j + \beta x_{ij}, \sigma^2)$, $j=1, \dots, n_i$; $i=1, \dots, m$ where without loss of generality $k_1 \equiv 1$, and the remaining unknown scaling factor $k_t \in (0, \infty)$, $t=2, \dots, m$, ($k_t^2 = \sigma^2 t / \sigma'^2 t$, $t \neq t'$), the unknown location parameter $\nu_t \in R^1$, the unknown regression coefficient $\beta \in R^1$, and the unknown variance $\sigma^2 \in (0, \infty)$, x_{ij} is a fixed number and the random variable

$\{k_i y_{ij} : j=1, \dots, n_i ; i=1, \dots, m\}$ is independent ... (1)

The model assumes that the m examiners while marking essays distribute marks in such a way that it gives rise to :

- (a) differences in averages, for one examiner is far more lenient than the others ; and
- (b) differences in dispersions, for one examiner spreads the marks far more widely on both sides of the average than the others.

To bring about uniformity in such cases, marks require two types of adjustment, i.e. shifting of origins of marking scale due to differences in averages, and rescaling the distributions due to differences in the dispersions. The question before us is whether the marks should at all be adjusted. If yes, then what type of adjustment should be carried out. To answer this question one should look for some statistical evidence. The desired evidence is to be found by testing, in a sequence, the following hypotheses regarding (a) and (b) above :

$$H_0 : v_1 = \dots = v_m = v ; k_1 = \dots = k_m = 1 ; \quad \dots(2)$$

$$H_B : k_1 = \dots = k_m = 1 ; \text{ and} \quad \dots(3)$$

$$H_L : v_1 = \dots = v_m = v \quad \dots(4)$$

against the assumed model.

The hypothesis H_0 means that the m examiners mark the essay in such a way that marks show no differences between averages and dispersions. Hence, marks need no relocation and rescaling. The hypothesis H_B means that the m examiners while marking essays spread marks over the same range, i.e. distributions of marks have equal dispersions. Hence marks need not be rescaled. The hypothesis H_L means that marks of the m examiners show no difference in averages. Therefore, marks need no relocation. All these hypotheses are to be tested in succession. Marks are to be adjusted using suitable location parameters v 's ; and/or scaling factors k 's depending upon the hypothesis accepted. Lord (1955), Potthoff (1966), and Singh (1975, 1978) obtain these adjustment parameters using 'maximum likelihood' technique.

Maximum Likelihood Estimates of the Parameters under the Model

Let

$$\theta_A \equiv (v_t, \beta, \sigma^2, k_t), t=1, \dots, m ; t=2, \dots, m ; \text{ and}$$

$$\Omega_A \equiv \{ \theta_A \mid v_t \in R', \beta \in R', \sigma^2 \in (0, \infty), k_t \in (0, \infty), t=1, \dots, m ; t=2, \dots, m \}.$$

Under the model the likelihood function of N observations is

$$L(\Omega_A) \equiv L(\theta_A) = (2\pi\sigma^2)^{-N/2} \left(\prod_{i=2}^m k_i^{n_i} \right) \exp. \left\{ -\frac{1}{2\sigma^2} \sum_{i=1}^m \sum_{j=1}^{n_i} \left(k_i y_{ij} - v_i - \beta x_{ij} \right)^2 \right\} \quad \dots (5)$$

The estimates of parameters θ_A are to be found by maximizing the logarithm of the likelihood function $L(\theta_A)$. Taking partial derivatives of the function $\log L(\theta)$ with respect to v_i , β , σ^2 , and k_i , $i=1, \dots, m$; $k=2, \dots, m$, and setting these derivatives equal to zero, we get the system of equations

$$\sum_{j=1}^{n_i} (k_i y_{ij} - v_i - \beta x_{ij}) = 0, \quad i=1, \dots, m \quad \dots (6)$$

$$\sum_{i=1}^m \sum_{j=1}^{n_i} (k_i y_{ij} - v_i - \beta x_{ij}) x_{ij} = 0 \quad \dots (7)$$

$$-\frac{N}{2\sigma^2} + \frac{1}{2\sigma^4} \sum_{i=1}^m \sum_{j=1}^{n_i} (k_i y_{ij} - v_i - \beta x_{ij})^2 = 0 \quad \dots (8)$$

$$-\frac{1}{k_i \sigma^2} \sum_{j=1}^{n_i} (k_i y_{ij} - v_i - \beta x_{ij}) y_{ij} = 0, \quad i=2, \dots, m \quad \dots (9)$$

The system of maximum likelihood equations (6)-(9) is difficult to solve analytically. Hence, numerical solutions are to be obtained by assuming some estimates (Rao 1965). Using these solutions as initial values in some iterative procedure which converges in 4-6 iterations, Eqs. (6) to (9) can be solved for better estimates. Estimates which solve the likelihood equations are called MLR of the parameters. Substituting these MLR in Eq. (5), we get

$$L(\hat{\theta}_A) = (2\pi\hat{\sigma}^2)^{-N/2} \left(\prod_{i=2}^m \hat{k}_i^{n_i} \right) \exp \left(-\frac{N}{2} \right) \quad \dots (10)$$

Maximum Likelihood Estimates of the Parameters under Hypothesis H_0

Let

$$\theta_{H_0} \equiv (v, \beta, \sigma^2),$$

$$\omega_{H_0} \equiv \{ \theta_{H_0} \mid v \in R', \beta \in R', \sigma^2 \in (0, \infty) \}$$

Under the hypothesis H_0 the likelihood function of N observations is

$$L(\omega_{H_0}) = L(\theta_{H_0}) = (2\pi\sigma^2)^{-N/2} \exp. \left\{ -\frac{1}{2\sigma^2} \sum_{i=1}^m \sum_{j=1}^{n_i} (y_{ij} - \nu - \beta x_{ij})^2 \right\} \quad \dots(11)$$

Estimates of the parameters θ_{H_0} are to be found by maximizing the logarithm of the likelihood function $L(\theta_{H_0})$. Taking partial derivatives of the function $\log L(\theta_{H_0})$, and setting these derivatives equal to zero, we get a system of likelihood equations solving which, we have

$$\hat{\nu} = \bar{y} - \hat{\beta} \bar{x} \quad \dots(12)$$

$$\hat{\beta} = \frac{\sum_{i=1}^m \sum_{j=1}^{n_i} (y_{ij} - \bar{y})(x_{ij} - \bar{x})}{\sum_{i=1}^m \sum_{j=1}^{n_i} (x_{ij} - \bar{x})^2} \quad \dots(13)$$

$$\hat{\sigma}^2 = \frac{1}{N} \sum_{i=1}^m \sum_{j=1}^{n_i} (y_{ij} - \hat{\nu} - \hat{\beta} x_{ij})^2 \quad \dots(14)$$

where

$$\bar{y} = \frac{1}{N} \sum_{i=1}^m \sum_{j=1}^{n_i} y_{ij}; \quad \bar{x} = \frac{1}{N} \sum_{i=1}^m \sum_{j=1}^{n_i} x_{ij}$$

Substituting these MLB of parameters θ_{H_0} in Eq. (12), we have

$$L(\hat{\theta}_{H_0}) = (2\pi\hat{\sigma}^2)^{-N/2} \exp \left(-\frac{N}{2} \right) \quad \dots (15)$$

Maximum Likelihood Estimates of Parameters under Hypothesis H_s

Let

$$\theta_{H_s} = (\nu, \beta, \sigma^2, k_i), \quad i=2, \dots, m;$$

$$\omega_{H_s} = \{\theta_{H_s} \mid \nu \in R', \beta \in R', \sigma^2 \in (0, \infty), k_i \in (0, \infty)\}$$

Under the hypothesis H_s the likelihood function of N observations is

$$L(\omega_{H_S}) \equiv L(\theta_{H_S}) = (2\pi\sigma^2)^{-N/2} \left(\prod_{i=2}^m k_i^{n_i} \right) \exp \left\{ -\frac{1}{2\sigma^2} \sum \sum \left(k_i y_{it} - v - \beta x_{it} \right)^2 \right\} \quad \dots(16)$$

Estimates of the parameters θ_{H_S} are to be found by maximizing the logarithm of the Eq. (16). Taking partial derivatives of the function $\log L(\theta_{H_S})$ with respect to θ_{H_S} and setting these derivatives equal to zero, we get a system of likelihood equations

$$\sum_{i=1}^m \sum_{j=1}^{n_i} (k_i y_{it} - v - \beta x_{it}) = 0, \quad t=1, \dots, m. \quad \dots(17)$$

$$\sum_{i=1}^m \sum_{j=1}^{n_i} (k_i y_{it} - v - \beta x_{it}) x_{it} = 0, \quad \dots(18)$$

$$-\frac{N}{2\sigma^2} + \frac{1}{2\sigma^4} \sum_{i=1}^m \sum_{j=1}^{n_i} (k_i y_{it} - v - \beta x_{it})^2 = 0 \quad \dots(19)$$

$$\frac{n_i}{k_i} - \frac{1}{\sigma^2} \sum_{j=1}^{n_i} (k_i y_{it} - v - \beta x_{it}) y_{it} = 0, \quad i=2, \dots, m. \quad \dots(20)$$

Eqs. (17)-(20) are difficult to solve analytically. Hence, as in the model, we obtain numerical estimates of θ_{H_S} . Substituting these MLE in Eq. (16), we get

$$L(\hat{\theta}_{H_S}) = (2\pi \hat{\sigma}^2)^{-N/2} \left(\prod_{i=2}^m \hat{k}_i^{n_i} \right) \exp \left(-\frac{N}{2} \right) \quad \dots(21)$$

Maximum Likelihood Estimates of Parameters under Hypothesis H_L .

Let

$$\theta_{H_L} \equiv (v_i, \beta, \sigma^2), \quad i=1, \dots, m,$$

$$\omega_{H_L} \equiv \{\theta_{H_L} \mid v_i \in R', \beta \in R', \sigma^2 \in (0, \infty)\}.$$

Under the hypothesis H_1 , the likelihood function of N observations is

$$L(\omega_{H_1}) = L(\theta_{H_1}) = (2\pi\sigma^2)^{-N/2} \exp \left\{ -\frac{1}{2\sigma^2} \sum_{i=1}^m \sum_{j=1}^{n_i} (y_{ij} - v_i - \beta x_{ij})^2 \right\} \quad \dots(22)$$

Estimates of the parameters θ_{H_1} are to be found by maximizing the logarithm of the likelihood function (22). Taking partial derivatives of the function $\log L(\theta_{H_1})$ with respect to θ_{H_1} , and setting these derivatives equal to zero, we get a system of likelihood Eqs.

$$\sum_{j=1}^{n_i} (y_{ij} - v_i - \beta x_{ij}) = 0; \quad i=1, \dots, m; \quad \dots(23)$$

$$\sum_{i=1}^m \sum_{j=1}^{n_i} (y_{ij} - v_i - \beta x_{ij}) x_{ij} = 0; \quad \dots(24)$$

$$-\frac{N}{2\sigma^2} + \frac{1}{2\sigma^2} \sum_{i=1}^m \sum_{j=1}^{n_i} (y_{ij} - v_i - \beta x_{ij})^2 = 0 \quad \dots(25)$$

Solving these equations, we get

$$\hat{v}_i = \bar{y}_i - \hat{\beta} \bar{x}_i; \quad i=1, \dots, m; \quad \dots(26)$$

$$\hat{\beta} = \sum_{i=1}^m \sum_{j=1}^{n_i} (y_{ij} - \bar{y}_i) (x_{ij} - \bar{x}_i) / \sum_{i=1}^m \sum_{j=1}^{n_i} (x_{ij} - \bar{x}_i)^2; \quad \dots(27)$$

$$\hat{\sigma}^2 = \frac{1}{N} \sum_{i=1}^m \sum_{j=1}^{n_i} (y_{ij} - \hat{v}_i - \hat{\beta} x_{ij})^2; \quad \dots(28)$$

where

$$\bar{y}_i = \sum_{j=1}^{n_i} y_{ij} / n_i; \quad \bar{x}_i = \sum_{j=1}^{n_i} x_{ij} / n_i.$$

Substituting these MLB in the likelihood function (22), we have

$$L(\hat{\theta}_{H_L}) = (2\pi\hat{\sigma}^2)^{-N/2} \exp(-N/2) \quad \dots(29)$$

Test of Goodness of Fit of the Models

We test the goodness of fit of the model, in large samples, using the likelihood ratio $\lambda \equiv L(\omega)/L(\Omega)$ technique.

(a) Hypothesis H_0 Vs. the Model

Let

$$\lambda_0 \equiv L(\hat{\theta}_{H_0}) / L(\hat{\theta}_\Lambda). \quad \dots(30)$$

Using the values of $L(\omega_{H_0})$, and $L(\Omega_\Lambda)$ i.e. $L(\hat{\theta}_{H_0})$, and $L(\hat{\theta}_\Lambda)$ as given in Eqs. (15) and (10), respectively, in Eq. (30), we have

$$\lambda_0 = \left(\frac{\hat{\sigma}^2}{\hat{\sigma}^2} \right)^{N/2} / \left(\prod_{i=2}^m \hat{k}_i^{n_i} \right) \quad \dots(31)$$

If the model holds, the asymptotic distribution of $-2\log \lambda_0$ is distributed as χ^2 with $d(r-s)$ degrees of freedom where r and s respectively are the number of independent parameters estimated under the model, and the hypothesis H_0 (Wilks 1962).

Cases where the observed value of $-2\log \lambda_0$ exceeds the tabulated value of $\chi^2_{\alpha}(\rho)$, the hypothesis is rejected at p probability level of significance, otherwise it is accepted. The acceptance of the hypothesis H_0 means marks of the m examiners have equal averages and equal dispersions. Thus marks of the m examiners need no adjustments due to differences in location parameters, and differences in scaling factors. But the rejection of the hypothesis H_0 provides a statistical evidence that marks need adjustments. Before carrying out any adjustments we would like to assure ourselves about the type of adjustments required. We, therefore, would like to proceed further, and test the remaining hypotheses, i.e. H_s and H_L , respectively, which will give us the exact types of adjustments.

(b) Hypotheses H_0 and H_1 , vs. the Model

Substituting $L(\theta_{H_0})$ and $L(\theta_{H_1})$ separately in Eqs. (21) and (29) we make the necessary tests of goodness of fit. Whichever hypothesis is accepted or rejected we use the formulation to adjust the marks accordingly. The adjusted marks y_{ij}^* of the j^{th} student marked by the i^{th} examiner under the model Λ , hypotheses H_0 , H_0 and H_1 , respectively are given as under :

$$\text{The model} : y_{ij}^* = k_i \frac{\Lambda}{y_{ij}} - v_i ; \quad \dots(32)$$

$$H_0 : y_{ij}^* = y_{ij} ; \quad \dots(33)$$

$$H_0 : y_{ij}^* = k_i \frac{\Lambda}{y_{ij}} ; \quad \dots(34)$$

$$H_1 : y_{ij}^* = y_{ij} - v_i. \quad \dots(35)$$

Example

Two hundred and six students for whom scores on an ability test are available, write a common essay examination. The answer-sheets are randomly assigned to three examiners. Examiners I, II, and III respectively mark 37, 92, and 77 answer-sheets. We have

$$m=3 ; n_1=37 ; n_2=92 ; n_3=77. \quad N = \sum_{i=1}^3 n_i = 206.$$

The likelihood equations (6)-(9), and (17)-(20) under the model and the hypothesis H_0 , respectively, are solved using the assumed estimates (Table 1) in the Newton-Raphson procedure. The estimates of parameters at the 6th iteration stabilized. The MLE of parameters under the hypotheses H_0 and H_1 solving Eqs. (12)-(14), and (26)-(28), respectively, are obtained. All these values are summarized in Table 2.

Goodness of Fit

Using these MLE we make a test of goodness of fit of the models. The criterion $-2\log \lambda$ is calculated under each hypothesis ; and given in the last column of Table 2. All the calculated values of $-2\log \lambda$

exceed the tabulated values at 5 per cent level of significance. Thus we reject all the hypotheses. Therefore, it is concluded that the model of this study is consistent with data and marks assigned by different examiners should be adjusted according to this model. Using the model the necessary adjustment equations for the j^{th} essay marked by examiners I, II, and III, respectively, are as under :

$$\text{Examiner I } y_{1j}^* = j_{1j} - 3.3976 \quad \dots (36)$$

$$\text{Examiner III } y_{2j}^* = 1.0222 \quad y_{2j} - 4.0920 \quad \dots (37)$$

$$\text{Examiner III } y_{3j}^* = 1.3431 \quad y_{3j} - 9.7915 \quad \dots (38)$$

TABLE 1
BASIC STATISTICS FOR SCORING ESTIMATES OF PARAMETERS

$\sigma_1^2 = 11.8881$	$\sigma_2^2 = 12.2558$	$\sigma_3^2 = 8.0278$
n_1 $\sum_{j=1}^n x_{1j}^2 = 3066.11$	n_2 $\sum_{j=1}^n x_{2j}^2 = 6625.86$	n_3 $\sum_{j=1}^n x_{3j}^2 = 6132.70$
n_1 $\sum_{j=1}^n y_{1j}^2 = 860.81$	n_2 $\sum_{j=1}^n y_{2j}^2 = 1882.74$	n_3 $\sum_{j=1}^n y_{3j}^2 = 868.08$
n_1 $\sum_{j=1}^n x_{1j} y_{1j} = 1136.08$	n_2 $\sum_{j=1}^n x_{2j} y_{2j} = 2236.23$	n_3 $\sum_{j=1}^n x_{3j} y_{3j} = 1238.05$

TABLE 2
MAXIMUM LIKELIHOOD ESTIMATES OF PARAMETERS

Parameter	v_1	v_2	v_3	β	σ^2	k_2	k_3	$-2 \log \lambda$
Model								
Model A	3.3676	4.0920	9.7915	0.3214	13.3974	1.0222	1.3431	
Hypothesis Ho	4.8923	4.8923	4.8923	0.2991	12.0087	1.0000	1.0000	26.9372
Hypothesis Hs	3.8977	4.4241	6.3067	0.2914	11.0099	1.0000	1.0000	9.0475
Hypothesis H _L	4.5635	4.5635	4.5635	0.2812	10.2956	0.9699	0.8810	20.3584

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Wastage in Education in India

A Case Study of Andhra Pradesh

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EDUCATION represents one of the largest industries in India, with more than 100 million public on rolls, 3.5 million teachers, 7.5 lakh institutions running at an annual expenditure of Rs. 25,000 million. Thus huge material and non-material resources go to education; the educational process takes place; and education yields some output. So educational system can be rightly treated as an industry or a group of industries in economic sense, producing manpower with a range of skills, young people as the 'intermediate products' moving from one part of the educational system to another, and the rest of the country outside the education system can be called the final recipient of the products of this industry ¹

So as we speak of wastage of resources in other industries, we can also speak of wastage of resources in the educational process. Wastage in education takes different forms which are discussed in the next section. It is of much importance to study the problem of wastage, because wastage reduces the efficiency of the educational system. Several studies

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¹See Haag (1965), Panchamukhi and Panchamukhi (1969), and Froomkin (1976) for some more reasons.

found that wastage of all kinds altogether push down the rates of return to education by 18.41 per cent.² The phenomenon not only causes wastage of money and human resources, but also, particularly, the problem at the lower levels is coming in our way of fulfilling the constitutional directive of universalization of elementary education and the constitutional objective of providing equality of opportunity in schools.

Wastage in Education : Scope and Nature of the Problem

Wastage in education affects the efficiency of investment resources in education, pushing up the input-output ratio in the educational industry, or pushing down the contribution of education to the economy. Wastage in education is of two kinds, viz. internal wastage, and external wastage

Internal Wastage

Internal wastage refers to wastage of resources within the educational system and reduction of the output of this industry, with a given level of input resources. Output shall be produced at less than optimum level, or simply, the input-output coefficient will be high because of internal wastage of resources. In other words, net output could have been maximized with the same input. Internal wastage is of the following three kinds.

(i) *Stagnation* : Wastage may be caused by failure of students in the final qualifying examination. This is familiarly known as wastage due to repetition or stagnation. Investments made on the pupils who do not qualify in the final examinations can be called a waste. So stagnation leads to an increase in the required period to complete the course and thus results in wastage.

(ii) *Drop-outs* : Secondly, wastage may also arise due to drop-outs. Pupils may quit schools or withdraw themselves from the schools for various reasons before they complete the given course. Then again, investment made on them is considered as waste. While the former kind is known as wastage due to stagnation, the latter is called wastage due to drop-outs or wastage due to premature withdrawal of pupils.³ Stric-

²e.g., see Pandit (1972), and Tilak (1980)

³In the existing literature the terms 'wastage' refers to wastage due to drop-outs, and 'stagnation' to the wastage due to stagnation.

tly speaking, one should not call this phenomenon a pure waste. Simply because one does not go through the 'qualifying examination', or does not complete the course, we cannot say that all the investments made on him is wasted. These drop-outs or stagnation may be due to several reasons, which we discuss later. Even though these 'unfinished' products are not equal to the finished products, they may obviously possess a majority of the effects of education in them—in stimulating his mental activity, in fostering in him a 'habit of wise inquisitiveness', making him 'more intelligent, more ready, and more trustworthy in his ordinary work', etc. This is true more particularly at secondary and higher levels of education. But this is not all. The productivity levels, or the rates of return to education obviously differ between those who successfully complete the course and those who do not. Particularly in the labour market the employer may not attach any weight to incomplete education and thus incomplete education constitutes wastage. At the primary level, drop-out in Grades I, II, III or IV, etc. before achieving literacy is a total waste. If one is likely to relapse into illiteracy even after completing Grade IV or V, even then the total investment made in his education constitutes wastage.

(iii) *Under-utilization of resources* : The third type of internal wastage, which we most often observe, relates to under-optimum use of resources. The concept of 'optimum' use of resources in education can be meaningfully interpreted with respect to the size of the educational institutions (in terms of enrolments), the amount of working hours, etc. Suppose a school can accommodate 500 pupils, given other things, and if it is run with enrolments below 500, this can be called inefficient or under-optimum use of scarce resources. Similarly, suppose if teachers are having less number of hours of work, it also amounts to under-utilization. Thus under-utilization amounts to wastage of education resources.

External Wastage

While the former kind of wastage results in direct wastage of investment resources in education, external wastage is that which we observe outside the educational industry. While internal wastage reduces the net output of the educational system, external wastage reduces the rates of return to or simply the productivity of education, i.e. it reduces the contribution of educational system to socio-economic growth of the economy. It is a problem concerned with the utilization of the output of the educational process. If there is wastage in the use of human

capital (acquired through investment in education), the investment resources put in the process of producing the human capital can be meaningfully considered as having been wasted. The four main types of external wastage in education are as follows.

(i) *Unemployment* : Is not the chronic unemployment among the educated colossal wastage of scarce education resources ? It is a waste both from the private and societal point of view. Both the individual and the society have made large investments in him. And, in turn, neither of the two receive any 'direct' reward except the 'spill-over' benefits of education.⁴ One may argue that the extent of educated unemployment reflects the failure of the society to advantageously use the human resources. It is true. But whatever may be the case, still the unemployment reflects wastage of educational resources.

(ii) *Non-participation in the labour force* : The second form of external wastage or external leakage is non-participation of the educated in the economy's labour force. When large investments have been made in the education of the people, and if the educated people, of a sizeable proportion of them do not enter the labour force, the entire educational investment on them can be treated as a huge waste.

(iii) *Emigration* : Emigration, which is more fashionably known as 'brain-drain' is another form of external wastage in education. Suppose for different reasons, people after finishing their education leave for abroad and almost settle there, or return after their active life time is over, does it not seem as a waste of educational resources, from the point of view of the country from which emigration takes place ? Society made investments in him and, in turn, he paid back nothing and left the country. It is also a kind of wastage and this happens mostly in the case of higher education.⁵ However, the value of the earnings that flow into the domestic economy to his relatives or parents (in foreign exchange) may be taken care of while calculating the magnitudes of wastage. However, the value of the remittances sent from abroad by these people would obviously be substantially less than the value of the total contribution they could have made to the economy had they not emigrated. The classical writers hold the view that while emigrating "a man carries away his marginal product" leaving those left behind

⁴For a list of spill-over benefits of education, see Weisbrod (1962). See also Tilak (1981)

⁵For instance, the brain-drain of 231,000 skilled labour from developing countries to the US, Canada and the UK is estimated to have cost the developing countries a whopping \$ 44 billion between 1961 and 1972 (*Times of India*, Bombay, 30.11.1981)

"neither better nor worse off"⁶ But this is true only if the emigration takes place in infinitesimally small quantities, but if it takes place at a considerable level, though not in a large scale, "there will necessarily be a loss for the L.D.C.'s depending on the extent of diminishing returns to professional manpower".⁷ The brain-drain is seriously felt in the loss of urgently needed manpower in the developing economies. It is also observed that brain-drain is an obstacle to income equality within the developing economies. It affects income distribution adversely.⁸

(iv) *Mortality* - Mortality is another external factor that leads to wastage of educational resources. It reduces the life-time earnings of the educated people, thus causing both the private and social loss of investment made in education. Mortality is a severe problem in several less developed countries. The less developed countries are characterized by the presence of food crisis, malnutrition, bad health, etc. which reduce the longevity as well as productivity of the people. For example, the life expectancy in the U. S. A., Japan and Australia is 70 years and in the U.K. 71 years, while in India it is 53 years according to the Planning Commission estimates.⁹ Shorter life expectancy implies wastage of resources. The resources invested in education of the people cannot bear full fruit because death occurs at an early age.

Size of the Problem

Most of the studies on wastage have been confined to internal wastage. Again, not all the three kinds of internal wastage could receive adequate attention. Drop-outs and stagnation have been occupying the central point of the studies.¹⁰ Little effort has been made to give a broader definition of the concept of wastage, so that external wastage and internal wastage caused by under-utilization of resources are covered. In this paper some evidence is presented which may throw some light on the size of the problem.

Internal Wastage

Wastage due to stagnation and drop-outs are generally estimated

⁶See Grubel and Scott (1966)

⁷Bhagavati and Dellalgar (1973)

⁸See Seers (1970)

⁹India 1975

¹⁰For a select bibliography on this problem see Misra and Tilak (1978)

by either of the following methods¹¹.

(a) *Apparent cohort method* : Using the cross-section data, wastage due to drop-outs and stagnation, in say primary level education is estimated as follows :

If W_t represents wastage in grade t , and X_t the enrolment of pupils in the same grade, then

$$W_t = [1 - (X_{t+1}/X_t)] 100 \quad \dots (1)$$

It may be noted that both X_t and X_{t+1} refer to the same year and hence this method can be known as *cross-section* apparent cohort method.

On the other hand, if time-series data are available, rate of wastage in grade i and in year t is given by

$$W_{it} = [1 - (X_{i+1, t+1}/X_{it})] 100 \quad \dots (2)$$

It is obvious that if one is interested in estimating wastage in a given level of education, say primary level of 5 years, then t in the above equation should refer to grade i and t the corresponding year, and in the nominator X_{i+1} and $X_{i+1, t+1}$ should be changed as X_{i+5} and $X_{i+5, t+5}$, respectively. This is called time series apparent cohort method and this is considered to be more meaningful than the earlier one, as we follow the progress of the pupils in Grade I through successive years and till the completion of the given level of education, instead of relating numbers of pupils in different grades in the same year as is the case in the cross-section method.

(b) *Reconstructed cohort method* : This method was used in a world-wide survey of educational wastage by the Unesco (1967). The method requires successive year-grade data on enrolment and repeaters in full cycle of a cohort. Then the number of promotees (p) are first derived for each grade by subtracting the given number of repeaters (r) from the total enrolment in the grade (X), i.e.

$$p = X - r \quad \dots (3)$$

Then drop-outs (d) can easily be worked out as the residual, i.e.

$$d = X - (p + r) \quad \dots (4)$$

Wastage due to stagnation W_s can then be defined as follows :

$$W_s = (r_{t, t+1}/X_{it}) 100 \quad \dots (5)$$

and wastage due to drop-outs (W_d) can be defined as

$$W_d = (d_{it}/X_{it}) 100 \quad \dots (6)$$

¹¹For a recent survey of the methods and estimates and for some selected states see Mishra and Tilak (1978), and Venkatasubrahmanyam (1978)

The reconstructed cohort method is more appealing than the apparent cohort method, but it requires data in detail.¹²

(c) *True cohort method* : Under this method longitudinal data on a single group of pupils are collected following up the group in subsequent years till they reach the final grade. It would be known that how many drop-outs and on what points how many migrate to outside, how many repeat and in what frequency, etc. Then the rates of wastage due to stagnation and drop-outs are easily estimated. The true cohort method is the most appropriate one, but it requires data in minute detail starting from the initial grade and year until the grade and year of completion.

(d) *Pupil-years method* : Sometime, particularly in the studies on stagnation, another method is used which can be called pupil-years method which is close to the true-cohort method. In this, the ratio of the actual pupils' years spent in a given level of education to the optimum years (number of years of study of that level) measures the extent of wastage. For instance, of the total number of pupils n , p takes 9 years, q takes 10 years and r takes 11 years to complete 8 years of elementary education. It may be noted that $p+q+r$ need not be equal to n . There may be some who take no more than 8 years.¹³ Then the wastage due to stagnation in this level of education

$$W_s = \left(1 - \frac{8n}{9p+10q+11r} \right) \times 100 \quad \dots(7)$$

Thus the method is essentially based on the ratio between the total optimum years and the actual years for all the pupils belonging to a single cohort.

(e) *Output-input method* : A very simple method sometimes used is the output-input method, according to which the index of wastage

$$W = \left[\frac{P_{t+1, t+1}}{X_{t, t}} \right] 100 \quad \dots(8)$$

where p represents the number of pupils promoted to the next grade, and $X_{t, t}$ is the number of pupils in Grade I in year t . The inverse of the output-input ratio is considered as a measure of wastage. Even though it is called output-input method, it may be noted that vitrually then is no difference between Eq. 2 and Eq. 8.

¹²See Unesco (1967) which used this method for a world-wide survey of the problem of wastage in education

¹³See Unesco (1967)

TABLE 1

WASTAGE AND STAGNATION IN SCHOOL LEVEL (GRADES I-X) EDUCATION IN ANDHRA PRADESH

Enrolment in Grade I	% Rate of Wastage and Stagnation (in Relation to Enrolment in Grade I) in								
	I	II	III	IV	V	VI	VII	VIII	IX
All									
1967-68	1468000	40.91							
69	1456900	40.90	53.56						
70	1397054	38.58	54.04	64.19					
71	1408165	38.33	52.23	63.74	70.64				
72	1406599	36.76	50.45	60.66	69.25	80.22			
73	1406664	36.81	49.23	58.95	66.59	79.51	79.89		
74	1392189	35.27	48.56	58.54	65.92	77.22	78.65	86.74	
75	1405779	35.72	48.47	58.02	65.20	76.09	76.09	85.85	87.83
76	1433394	36.36	48.22	57.89	65.60	74.57	73.50	85.86	87.07
77	1563346	37.74	50.60	60.28	67.20	77.52	77.03	86.15	87.45
Mean									88.99
Boys									
1967-68	868000	41.35							
69	860787	41.26	53.48						
70	825951	38.69	53.89	62.95	69.36				
71	834499	37.89	51.66	62.88	67.87	77.35			
72	848466	38.55	49.84	59.68	76.55	76.60			
73	841334	38.14	50.14	58.64	65.30	75.14	84.22		
74	830028	36.13	49.14	58.48	64.19	74.06	83.09	85.40	
75	835533	36.93	48.96	57.90	64.47	72.88	72.21	84.47	86.71
76	850370	36.61	48.21	57.30	64.25	71.99	69.14	83.26	84.71
77	921310	38.39	50.67	59.69	65.91	74.57	73.27	83.52	84.94
Mean									

Girls	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	Mean
	600000	40.28									
69	596113	40.38	53.67								
70	571103	38.44	54.25	65.99							
71	573666	38.96	53.05	65.05	72.51						
72	558133	34.04	51.33	62.08	71.25	84.36					
73	563330	34.82	47.84	59.41	68.46	83.79	84.65				
74	562161	33.99	47.69	58.62	68.43	81.80	83.73	90.38			
75	570246	33.94	47.75	58.20	66.32	80.76	81.79	89.84	91.35		
76	583024	36.00	48.24	58.75	67.60	78.49	79.84	80.61	90.81	92.29	
77	642036	36.76	50.48	61.16	69.10	81.84	82.50	89.94	91.08	92.99	

WASTAGE IN EDUCATION IN INDIA

TABLE 2

WASTAGE AND STAGNATION IN SECONDARY SCHOOLS IN
ANDHRA PRADESH

<i>Enrolment in Grade VI</i>		<i>% Rate of Wastage and Stagnation in Grade</i>			
		<i>VI</i>	<i>VII</i>	<i>VIII</i>	<i>IX</i>
All					
1968-69	293078				
70	285638	23.91			
71	282064	22.36	26.33		
72	272916	6.78	44.46	43.95	
73	290415	-2.66	37.71	46.91	46.66
74	298504	-1.64	28.63	40.75	50.17
75	318195	-4.19	32.98	35.73	45.45
76	336648	-4.97	30.76	38.49	38.77
77	357652	-10.87	37.91	36.87	44.36
Mean		3.59	35.57	40.45	45.08
Boys					
1968-69	205638				
70	199792	22.80			
71	192624	22.67	34.28		
72	186284	3.93	43.01	41.18	
73	196594	-4.11	35.32	45.70	44.08
74	201876	-3.30	25.96	38.13	47.99
75	314266	-6.02	30.04	32.68	42.14
76	226289	-7.13	27.90	35.54	34.71
77	237614	-13.82	35.48	33.78	41.32
Mean		1.75	33.14	37.84	42.05
Girls					
1968-69	87440				
70	85846	26.51			
71	89440	23.97	41.13		
72	86632	12.93	47.83	50.46	
73	93821	0.45	42.86	49.74	52.76
74	96628	1.84	34.36	46.40	55.26
75	103929	-0.38	38.50	42.27	52.56
76	110359	-0.51	37.35	44.67	47.50
77	120038	-4.81	42.91	43.33	50.71
Mean		-7.50	40.71	46.15	51.76

As the data are available only on enrolments in each grade, we are able to follow the apparent cohort method and accordingly estimate the rate of wastage due to drop-outs and stagnation in school education (Classes I to X) in the State of Andhra Pradesh and as such cannot give separate estimates for drop-outs and stagnation. We made two types of estimates of wastage rates: First, keeping i and t in the denominator in the formula (2) constant at 1 and 1967-68, for school education (Classes I-X), and at 6 and 1968-69 for high school education (Classes VI-X), we estimated how much percentage of pupils joined in the Grade I/VI in the base year dropped out/stagnated during the successive grades in the successive years. These estimates are presented in Tables 1 and 2. The negative rates in a few cases (Tables 2, 3, 5 and 7) may not make much sense. They may be due to high stagnation rates.

Secondly, by slightly modifying the same formula (2) we also estimated for each year the percentage of wastage in each grade in relation to the enrolment in the preceding grade and year. These results are presented in Table 3. This measure helps us to make temporal comparisons of wastage rates. The average of the rates of wastage have also been computed in order to give us an idea of the problem after balancing the effect on enrolment figures of sudden or short-lived rise and fall in the enrolment figures due to a variety of factors such as enrolment drives, creation of new schools, etc. Similar estimates have also been made for scheduled castes and scheduled tribes together using the available data for 7 years from 1970-71 onwards, so that we know the severity of the problem in great detail with respect to the depressed sections of the society. The results are given in Tables 4 through 6. An important limitation of the method we adopted is that it does not give us separate estimates for wastage due to drop-outs and stagnation. Further, it does not allow us to make any adjustment for inter-state migration, mortality among children, etc.

Time series data are not available on enrolments with rural-urban break-up. But rates of wastage differ considerably between rural and urban areas. So based on the cross-section data for the year 1973, collected during the *Third All India Educational Survey*, we estimated rates of wastage in rural and urban by sex using the same apparent cohort method formula (1). The results are presented in Table 7. We have also computed stagnation rates separately for some selected levels of education, particularly at the end of which public/university examinations are held. The stagnation rates are shown in Table 8.

The large number of estimates presented in these tables speak of

TABLE 3

WASTAGE AND STAGNATION IN SCHOOL LEVEL (I-X) EDUCATION (IN RELATION TO THE ENROLMENT
IN THE PRECEDING GRADE, YEAR) IN ANDHRA PRADESH

<i>% Rate of Wastage and Stagnation (in Relation to the Enrolment in Preceding Grade, Year) in</i>										
I	II	III	IV	V	VI	VII	VIII	IX		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)		
All										
1968-69	40.90	21.40	21.51	15.72	32.01	23.91	22.23	..	..	..
70	38.58	22.23	22.90	20.66	34.85	22.36	16.32	15.28	..	..
71	38.33	22.22	21.12	18.02	35.24	6.78	28.47	11.97	..	..
72	36.76	19.65	17.65	15.19	32.61	-2.66	33.18	4.41	..	..
73	36.81	19.17	17.17	15.08	33.36	-1.64	30.48	4.88	..	..
74	35.27	18.60	18.34	16.96	31.82	-4.19	34.06	9.94	..	..
75	35.72	20.40	18.39	16.08	29.86	-4.97	33.74	8.22	..	..
76	36.36	19.46	18.27	18.05	26.93	-10.87	40.85	8.56	..	..
Mean	37.34	20.46	19.42	16.97	32.09	3.59	29.92	9.04	..	..
Boys										
1968-69	41.26	20.69	19.32	12.33	24.13	22.81	19.09	..	..	..
70	38.69	21.50	20.35	17.79	29.47	21.67	14.88	15.95	..	..
71	37.89	21.17	19.42	17.30	29.89	3.93	27.25	10.50	..	..
72	38.55	19.24	16.59	13.53	26.09	-4.11	32.67	4.71	..	..
73	38.14	18.85	17.55	13.94	27.01	-3.30	28.88	4.34	..	..
74	36.13	17.79	16.74	13.42	25.24	-6.02	32.57	9.08	..	..
75	36.93	20.09	17.22	14.42	24.27	-7.13	31.99	7.46	..	..
76	36.91	17.89	16.35	15.09	21.18	-13.82	39.77	8.16	..	..
Mean	38.06	19.66	17.94	14.73	25.91	1.75	28.41	8.60	..	..

Girls

1968-69	40.38	22.42	24.69	20.95	45.25	26.51	29.99	...	...
70	38.44	23.27	26.60	25.13	44.04	23.99	19.90	13.36	...
71	38.96	23.74	23.60	19.16	44.37	12.93	31.38	15.84	7.86
72	34.04	20.26	19.23	17.75	43.32	0.45	34.38	3.66	4.66
73	34.82	20.92	16.61	16.83	43.61	1.84	34.08	6.19	10.98
74	33.99	19.75	20.66	22.21	42.30	-0.38	37.35	12.03	11.50
75	33.94	20.84	20.08	18.61	39.07	-0.51	37.59	10.03	9.06
76	36.00	21.65	21.05	22.49	36.14	-4.81	43.20	9.54	10.93
Mean	36.32	21.61	21.57	20.39	42.24	7.50	33.48	10.09	9.17

TABLE 4

WASTAGE AND STAGNATION IN ELEMENTARY EDUCATION IN
ANDHRA PRADESH (SCHEDULED CASTES AND TRIBES)

<i>Enrolment in</i>		<i>% Rate of Wastage and Stagnation in</i>					
<i>Grade I</i>		<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>
<hr/>							
All							
1970-71	211900						
72	237751	34.76					
73	241713	36.71	48.45				
74	240033	36.67	51.85	58.97			
75	247724	36.48	52.33	63.42	69.73		
76	243558	37.19	50.11	62.45	71.62	82.09	
77	319897	33.55	52.00	61.50	70.56	83.60	81.55
Mean		35.89	50.95	61.58	70.64	82.85	81.55
<hr/>							
Boys							
1970-71	129807						
72	144433	35.67					
73	152042	36.01	47.04				
74	149977	38.79	51.82	58.27			
75	156269	38.07	53.07	61.78	69.02		
76	150367	39.25	51.35	62.90	70.04	80.23	
77	198370	32.99	52.57	61.37	70.56	81.07	78.70
Mean		36.80	51.17	61.08	69.87	80.65	78.70
<hr/>							
Girls							
1970-71	82093						
72	93318	33.33					
73	89671	37.79	50.68				
74	90058	33.07	51.90	60.08			
75	91455	33.83	51.09	65.97	70.85		
76	93191	33.67	48.06	61.69	74.08	85.03	
77	121527	34.46	51.02	61.72	70.54	87.52	86.06
Mean		34.36	50.55	62.37	71.82	86.28	86.06

themselves about the nature and magnitude of the problem. However, the main results emerging from them can be briefly noted as follows :

1. The magnitudes of the problem is very severe. Out of the 100 pupils that enter in Grade I only 37 pupils reach Grade V and about 11 pupils reach Grade X. Out of 100 pupils entering Grade VI about 44 drop out/stagnate before reaching Grade X.

TABLE 5

WASTAGE AND STAGNATION IN SECONDARY SCHOOLS IN ANDHRA PRADESH (SCHEDULED CASTES AND TRIBES)

		% Rate of Wastage and Stagnation in			
Enrolment in Grade VI		VI	VII	VIII	IX
All					
1970-71	30468				
72	30909	12.47			
73	31956	8.16	38.43		
74	33316	4.02	33.58	46.15	
75	35876	2.45	38.97	46.91	56.26
76	37949	4.49	39.99	47.11	52.73
77	38981	-2.99	47.89	45.76	50.37
Mean		4.77	39.77	46.48	53.19
Boys					
1970-71	21506				
72	21593	13.54			
73	22115	8.66	38.60		
74	22445	6.17	35.03	45.67	
75	24192	1.02	39.86	45.17	53.90
76	25660	2.43	36.96	47.14	49.95
77	27338	-7.73	45.29	42.98	49.64
Mean		4.02	39.15	45.24	51.16
Girls					
1970-71	8962				
72	9316	9.89			
73	9841	7.11	38.04		
74	10871	2.34	30.23	47.30	
75	11684	5.42	38.98	50.92	61.93
76	12289	8.76	46.24	48.82	59.27
77	11643	6.89	53.29	51.49	54.34
Mean		6.74	41.36	49.63	58.48

2. The drop-out rates are higher in all grades among girls than among boys. The rate is as high as 93 per cent for girls in the school education as against 87 per cent among boys. At the primary level the difference is about 10 per cent. So those who stay in schools among girls perhaps fare better than boys.
3. The problem is quite contrary to common thinking, of the same magnitude among the scheduled castes/tribes.

TABLE 6

WASTAGE AND STAGNATION IN SCHOOL LEVEL (I-X) EDUCATION (IN RELATION TO THE ENROLMENT IN THE PRECEDING GRADE/YEAR) IN ANDHRA PRADESH—SCHEDULED CASTES AND TRIBES

% Rate of Wastage and Stagnation (in Relation to the Enrolment in the Preceding Grade) in Grade									
	I	II	III	IV	V	VI	VII	VIII	IX
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
All									
1970-71	34.76	27.05	17.62	18.25	39.73	12.47	30.11	6.43	5.10
72	36.72	20.98	12.66	17.28	41.37	8.20	29.67	11.57	5.52
73	36.67	23.92	20.41	23.30	44.10	4.02	27.66	12.53	13.10
74	36.48	24.73	24.04	26.23	43.98	2.45	36.41	20.06	18.78
75	37.19	21.46	21.23	22.43	40.83	4.49	38.48	13.34	10.97
76	33.55	23.58	22.83	21.58	42.22	-2.99	45.44	9.62	6.53
Mean	35.89	23.62	19.80	21.51	42.04	4.77	34.63	12.26	10.00
Boys									
1970-71	35.66	24.86	17.32	17.06	31.62	13.54	31.61	2.36	2.32
72	36.01	17.68	12.39	18.97	33.81	8.67	28.98	9.51	6.00
73	38.79	24.70	21.20	21.62	37.87	4.77	28.87	11.52	12.39
74	38.07	23.32	20.67	25.77	40.10	1.02	35.91	15.61	15.15
75	39.25	21.44	20.96	21.62	36.19	2.43	36.31	12.11	8.72
76	49.21	21.93	20.61	20.66	36.83	-7.73	43.95	9.56	4.72
Mean	39.50	22.32	18.84	20.95	36.07	3.78	34.27	10.11	8.22

Girls										
1970-71	33.23	30.28	18.10	20.07	52.74	9.89	26.32	15.82	12.53	
72	37.79	26.02	13.25	14.54	53.33	7.11	31.24	16.38	4.24	
73	33.07	22.68	19.06	26.03	53.68	2.34	24.89	14.98	14.91	
74	33.83	26.93	29.26	27.00	50.59	5.42	37.52	29.66	27.76	
75	33.67	21.50	21.68	23.84	48.64	8.76	43.16	16.12	16.80	
76	34.46	26.15	26.30	23.10	51.86	6.89	48.81	9.79	10.80	
Mean	34.36	25.59	21.28	22.43	51.81	6.74	35.32	17.13	14.51	

WASTAGE IN EDUCATION IN INDIA

TABLE 7

A. WASTAGE AND STAGNATION IN EDUCATION (BY REGIONS) IN
ANDHRA PRADESH

		Enrolment in Grade I	% Rate of Wastage and Stagnation in Grade						
			I	II	III	IV	V	VI	VII
<i>All Areas</i>									
Boys	809890	36.87	47.22	57.05	65.62	75.86	75.65	83.44	
Girls	551753	35.01	46.92	59.50	68.98	82.28	83.57	89.81	
All	1361643	36.12	47.10	58.04	66.98	78.44	78.86	86.02	
<i>Rural</i>									
Boys	674186	40.31	51.06	61.73	70.40	82.70	82.97	89.68	
Girls	435645	38.88	51.65	65.29	74.26	89.60	91.05	95.47	
All	1109831	39.75	51.29	63.13	71.91	85.41	86.14	91.95	
<i>Urban</i>									
Boys	135704	19.80	28.14	33.78	41.87	41.86	39.29	52.48	
Girls	116108	20.49	29.18	37.80	49.17	54.58	55.47	61.55	
All	251812	20.12	28.62	35.64	45.23	47.72	46.75	59.89	

B. WASTAGE AND STAGNATION (IN RELATION TO THE
PRECEDING GRADE)

	% Rate of Wastage and Stagnation in Grade						
	I	II	III	IV	V	VI	VII
<i>All Areas</i>							
Boys	36.87	16.39	18.63	19.95	29.78	-0.85	32.01
Girls	35.01	18.33	23.71	23.41	42.70	7.53	37.97
All	36.12	17.19	20.69	21.30	34.70	1.95	33.88
<i>Rural</i>							
Boys	40.31	18.01	21.81	22.65	41.56	1.56	39.38
Girls	38.88	20.89	28.21	25.86	59.58	14.01	49.38
All	39.75	19.16	24.30	23.83	48.04	5.04	41.92
<i>Urban</i>							
Boys	19.80	10.39	7.36	12.21	-0.02	-4.41	21.72
Girls	20.49	10.94	12.17	18.28	10.64	1.97	29.37
All	20.12	10.64	9.83	14.91	4.55	-1.86	24.67

Source : Based on the *Third All-India Educational Survey 1973*, New Delhi

4. Even with all the limitations of the cross-section apparent cohort method, we find that the figures derived from the two methods are not highly uncomparable. The estimates in Table 6 reveal that there is significant difference between rural and urban wastage rates. The rate of wastage in rural areas at the elementary level (Classes I-VII) is as high as 92 per cent, while the corresponding figure is 60 per cent in urban areas.
5. Almost all the tables make it clear that the rate of wastage is at its peak at the Grade V, when a majority of pupils have to normally change from primary school to high school (except pupils in upper-primary schools).
6. Once the pupils cross Grade V, a large number of pupils do not drop out or stagnate until in Grade VII, when pupils have to appear for the first public examinations in their student career. The rate of stagnation here is about 56 per cent.

Findings Nos. 5 and 6 lead us to the following important policy conclusions :

- If the existing system of no examinations until the pupils reach Grade VII were to continue, it would be better to convert the primary schools into upper-primary schools, so that they would not be required to change their schools after the primary level education. This is most likely to reduce the extent of wastage at Grade V.
- On the other hand, if examinations are held only in Grade X in the school cycle, as is recently suggested by the University Grants Commission, this may reduce wastage in Grade VII to a large extent.
- But it is clear from Table 8, stagnation at the school final (SSC) examination is as high as 80 per cent. The same is the magnitude at the + 2 stage. The stagnation rates are in the range of 40 to 58 per cent at the graduate level and the rates fell down steeply only at the higher level.
- The reasons for drop-outs and stagnation are well-known. Broadly the causes are of three categories : economic poverty, social factors and school variables. There is no need of analysing them here further.

Under-utilization of resources : Capacity-under-utilization is an essential characteristic feature of the Indian industries. Educational

industry is no exception to this. A large number of schools and colleges are uneconomic in size. According to the Education Commission (1966) more than 70 per cent of the primary schools, 80 per cent of the middle schools and 80 per cent of the high schools were having enrolments much below the optimum level in Andhra Pradesh. Table 9 presents an idea of this problem. At the higher level according to 1976-77 figures, 54.4 per cent of the colleges (111 out of 204) in Andhra Pradesh are 'non-viable' having enrolments less than 400.¹⁴

TABLE 8
FAILURE RATES IN EDUCATION IN ANDHRA PRADESH

	(per cent)		
	Boys	Girls	All
Class VII Public Examination	44.23	43.10	56.13
SSC Public Examination	80.57	77.86	72.86
Intermediate	80.64	76.07	79.57
<i>Higher</i>			
B. A.	—	—	39.88
B. Sc.,	—	—	44.61
B. A./B. Sc./B. Com.	—	—	45.64
M. A.	—	—	7.90
M. Sc.	—	—	14.36
M. Com.	—	—	17.44
M. A./M. Sc./M. Com.	—	—	10.36
All Higher	—	—	42.21

Note : Rates relating to Class VII, SSC, and intermediate relate to 1976, and others to 1974

—Not available

Sources : 1. Rates relating to Class VII, SSC, and intermediate are based on the data collected from *Handbook of Statistics A.P.*, 1976

2. Rates relating to higher level are based on the data collected from the *Statistical Abstract of Andhra Pradesh*, 1974

Further, when the 'optimum' number of teachers of a primary school is 4-5, we have several single-teacher primary schools. 22.5 per cent of the primary schools in Andhra Pradesh belonged to this category in 1966-67. But the figures increased at a rapid rate to 47.2 per cent by 1970-71.¹⁵ When there is adequate evidence to show that the size of the

¹⁴Report of the Year 1976-77 (UGC)

¹⁵*Education in India*, Vols. I and II (1966-67 and 1970-71)

educational institutions is intimately related to the efficiency of the educational investments, it is clear that the under-optimum and over-optimum institutions adversely affect the efficiency of the system.

TABLE 9
DISTRIBUTION OF SCHOOLS BY SIZE IN ANDHRA PRADESH, 1965

	<i>Enrolment Group</i>	<i>% of Schools</i>
Primary	Below 50	27.3
	50-99	40.7
	100-99	22.5
	180-239	4.9
	240-399	4.2
	above 400	0.4
	Total	100.0
	(Optimum Size : 160-200)	
Middle	Below 80	44.5
	80-199	29.6
	200-279	7.1
	280-399	9.0
	400 and above	9.8
	Total	100.0
	(Optimum Size : 300-400)	
Secondary	Below 100	41.1
	100-239	32.6
	240-319	7.4
	320-479	13.0
	480 and above	5.9
	Total	100.0
	(Optimum Size : 360-450)	

Source : Education Commission (1966)

The growth of institutions of uneconomic size is purely due to irrational policy with respect to educational expansion. Rational policy in educational planning has often been suspended by political pressures particularly in opening new units. The politician tries to carry favour with his constituents "by founding or helping to open a school or college in his area".¹⁰ The schools and colleges having born out of political

¹⁰Blaug (1968) See also Rudolph and Rudolph (1972) for the role of politics in educational development in India

pressures and non-academic reasons suffer from several drawbacks with uneconomic size, under-optimum pupil-teacher ratio, disadvantageous location, etc. So there is an urgent need either to eliminate or consolidate the small and uneconomic units, so that efficiency of the educational system improves.¹⁷

External Wastage

There is considerable amount of literature on various types of external wastage. But most of the studies done are outside the field of economics of education, nor they are related to the wastage problem. However, in the studies in the field of economics of education, more particularly in the rates of return studies, these problems are studied, though not in great depth, while making adjustments in earnings profiles. However, these issues were not studied in the context of educational wastage.

(i) *Unemployment* : Table 10 shows the growth of educated unemployment in Andhra Pradesh. The proportion of educated unemployed to the total applicants on the live registers increased from 31 per cent in 1961 to 51 per cent in 1972. Further, the rate of growth of postgraduate unemployed is higher than the rate of growth of graduates and matriculates. In all, the educated unemployed increased at a compound rate of growth of 16 per cent per annum. Thus one can say that wastage of educational resources due to unemployment also increased at the same alarming rate.

(ii) *Non-participation in the labour force* : Non-participation is another kind of wastage of educational resources. Investment made in the education of those persons who join the ranks of non-workers takes the form of sunk capital and constitutes a wastage of educational resources. Using the 1971 census data, we estimate here rates of non-participation in the labour force in the State of Andhra Pradesh. These are known as crude labour force non-participation rates as we could not, due to unavailability of data, find out the 'general' rate nor the 'age-specific rate' by educational levels.¹⁸ The method is as follows.

If NW_i represents non-workers with i -th level of education, and P_i represents population with i -th level of education, the crude rate of non-participation in the labour force (CRLFNPR)

$$\text{CRLFNPR} = (NW_i / P_i) \times 100 \quad \dots (7)$$

¹⁷For class size and its effects on efficiency, see Haddad (1978)

¹⁸For the different concepts of labour force participation rates and their estimates with respect to Andhra Pradesh see Tilak (1978)

TABLE 10

NUMBER OF PERSONS ON THE LIVE REGISTERS OF THE
EMPLOYMENT EXCHANGES IN ANDHRA PRADESH

Year	Total Applications on the Live Registers	Educated			Total	(6) in (2) per cent
		Matriculates	Graduates	Post- gradu- ates		
1961	106796	29424	3690	—	33114	31.0
1962	118278	32158	3526	—	35684	30.2
1963	133438	35415	3460	—	38875	29.1
1964	125941	38066	3988	567	42621	33.8
1965	138597	35769	2694	594	39057	28.2
1966	143638	47314	2284	576	50174	34.9
1967	155176	53894	4920	420	59234	38.2
1968	174912	67256	8482	1303	77041	44.0
1969	216254	85542	18356	1312	100210	46.3
1970	271679	134810	13931	1631	150372	54.0
1971	336151	145324	21500	2483	169307	50.4
1972	367382	157972	28822	2207	189001	51.4
1975	—	253333	57080	7060	317479	—
Annual Compound Rate of Growth (%)	10.85	15.43	20.03	23.39	16.26	—

Sources : 1 Report of the Committee on Unemployment, 1973, DGET, Ministry of Labour, Govt. of India, New Delhi, p. 364

2. P. Shaunkar (1978) for 1975 figures

—Not Available.

We computed the rates for males, females, rural and urban people separately and they are presented in Table 11. These rates allow us to make the following important observations :

1. Barring illiterates, labour force non-participation rate falls as educational level increases. There is less amount of wastage at higher level, but the rate is as high as 36 per cent.
2. At all levels of education, there is considerable difference between the rates of non-participation in the labour force among males and females. While the range is 21 per cent to 47 per cent among males, there is a range of 55 to 95 per cent

among females. Thus the wastage of educational resources is very high among women compared to men.

3. The labour force non-participation rates are relatively lower in rural areas than in urban areas.

TABLE 11
RATE OF NON-PARTICIPATION IN WORK FORCE IN
ANDHRA PRADESH BY EDUCATIONAL LEVELS, 1971

	All	Males	Females	Rural	Urban
Illiteracy	59.74	43.68	72.79	57.47	74.25
Literacy*	64.85	47.28	94.37	55.53	78.75
Primary	53.21	33.01	92.36	49.35	63.62
Middle	39.92	11.38	91.84	49.50	61.21
Secondary	44.83	36.12	84.84	39.25	48.93
Higher	25.88	21.19	54.93	28.37	25.03
All	58.61	41.78	75.84	56.06	69.27

* Without any schooling

Source : Based on the *Census of India 1971*

Due to unavailability of data, we have estimated non-participation rates in the labour force without making any adjustments. Adjusted rates may be slightly lower than these estimates. Hence our estimates can be termed as over-estimates. But the margin of error is not likely to be very significant.¹⁹

Non-participation in the labour force is influenced by several factors. Apart from education and the wealth and property, health forms an important variable influencing the non-participation in the labour force. Non-participation among females is highly influenced by their fertility and the size of the family which determine the magnitude of family responsibilities, apart from social factors. While 'to work' is considered as a basic right, 'not to work' should be eliminated to the extent possible. The wastage of resources in the form of non-participation of the educated in the labour force could not receive adequate attention from the policy-makers, since the problem of educated unemployment itself is not yet satisfactorily solved.

(iii) *Emigration* : In India, brain-drain or emigration of the educated is a serious problem. On an average 5,000 manpower goes abroad

¹⁹See Tilak (1978) for some more details

every year. From Andhra Pradesh alone about 300 people leave the country every year. The figure was about 330 persons in 1968-69 and it fell down marginally to 240 in 1970-71. If all of them return home acquiring more skills and knowledge, the short-run loss incurred by the society due to emigration may be compensated or even over-compensated in the long run. But a "considerable proportion—we have no precise estimates—of those who go abroad tend to stay indefinitely and a sizeable number accept foreign nationality".²⁰ Thus the problem becomes a serious one resulting in heavy loss of educational investments.

It is not difficult to guess the possible reasons of emigration. People mainly emigrate to other countries, particularly to developed countries, only when they do not find adequate returns, to their education and skills in the domestic economy. Several advanced and less advanced economies are resorting to direct measures to check emigration such as granting no passports, closing gates to others by the country into which people emigrate, etc. But the liberals often condemn such direct measures. So there have been proposals to impose a tax on emigrants by the countries from which people emigrate.²¹ Bhagavati and Dellafar (1973) cite the example of Soviet Union which has announced a similar tax in 1972 scaling it by the level of educational attainment. The Soviet Union has justified the tax on one important ground—it is a compensation for the Soviet investment in the education of the emigrants. Such a tax "both compensates L.D.C.'s for the real losses imposed by the brain-drain and practically deters the brain-drain" (p. 95).

(iv) *Mortality* : The mortality rate is very high in India. The life-expectancy at birth, however, made a sharp increase overtime. The expectancy of life at birth for males in India increased from 26.9 in 1937 to 47.1 in 1971. The corresponding figures for females are 26.6 and 45.6, respectively. However, these figures relating to 1971 are also very low compared to the figures in advanced countries. The high mortality rate may be mostly due to poor quality of food leading to several diseases and inadequate health facilities. The age-specific death rates for the State of Andhra Pradesh are shown in Table 12 based on which we can observe that :

1. Infant mortality is very high in the State.
2. Mortality rate is higher in rural areas than in urban areas.

²⁰Education Commission (1966), p. 416

²¹See Bhagavati and Dellafar (1973)

3. Mortality rate among females is higher than males in almost all age-groups.

TABLE 12

AGE-SPECIFIC DEATH RATES PER 1000 IN ANDHRA PRADESH, 1974

Age-Group	Rural			Urban		
	Males	Females	All	Males	Females	All
0-1	170.3	158.64	164.4	83.3	77.3	80.4
1-4	30.7	30.1	30.4	10.7	12.5	11.6
5-9	5.6	5.4	3.7	3.7	3.7	3.7
10-14	1.6	3.2	2.4	1.3	2.2	1.7
15-19	3.4	4.4	3.9	1.5	1.2	1.6
20-24	2.6	5.7	4.1	2.9	3.5	3.2
25-29	4.9	5.4	5.2	2.2	3.5	2.9
30-34	6.8	5.2	5.9	2.5	2.1	2.3
35-39	5.6	5.5	5.6	10.7	4.7	7.6
40-44	9.9	7.6	8.8	4.9	6.7	5.8
45-49	13.4	10.1	11.8	8.9	6.3	7.7
50-54	17.5	16.1	16.9	16.5	14.6	15.6
55-59	30.1	20.1	25.2	35.3	23.3	29.0
60-64	48.9	41.7	45.2	43.2	34.1	38.3
65-69	51.7	53.2	52.5	67.2	41.1	52.6
70-	113.6	108.7	111.0	95.4	97.2	96.5

Source : *Statistical Year Book of Andhra Pradesh, 1976*, Government of Andhra Pradesh, Hyderabad

Thus we find that health care is urgently needed for the infants to check the mortality rate. Further, the poor medical facilities in rural areas may be the main factor responsible for high mortality rate in the rural areas. So medical facilities should be spread in large scale in rural areas. Fortunately this formed an important part of the National Programme of Minimum Needs of the recent plans in India.²² Illiteracy and ignorance among the females should be eradicated to improve the probability of survival among the infants.

Conclusions

Education yields not only economic benefits in the form of higher earnings, but also yields a huge amount of non-economic benefits both

²²See *Draft Five Year Plan, 1978-83*

to the individual and to the society. Looked at the problems from this point of view, all the apparent wastage is not real wastage, since even the drop-outs and repeaters may be possessing some of the benefits of education. For instance, drop-outs and repeaters at lower classes (I-V) involved total waste of resources, because the child may relapse into illiteracy and he would be equivalent to an uneducated man. On the other hand, drop-out at higher level does not involve total wastage. Similarly, stagnation, unemployment, non-participation, etc. do not lead to total wastage of resources. However, neither the society, nor the individuals themselves would be able to reap the full benefits of education. So it is at least a partial wastage of resources.

However, it should be realized that the problem of wastage of educational resources in India is too big to ignore any more. Wastage in education, in several forms such as drop-outs, stagnation, under-utilization of resources, unemployment, non-participation in the labour force, emigration and mortality, results in heavy loss of scarce resources of the economy.

Since the problem of wastage owes its origin to social, economic and educational factors, minimization of the magnitude of wastage in education needs a simultaneous and determined attack on social evils and weaknesses in the educational system²⁰. It may be noted that it does not need huge financial resources. On the other hand, this results in a large set of internal and external economies, improving the efficiency of the educational system in terms of reduction in costs per pupil and increase in the output and contribution of the educational system to the economic development of the country.

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²⁰See *Citizens for Democracy* (1978)

A Factorial Study of Adolescent Thought Using Piaget-type Tasks

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THE SCIENTIFIC investigation of thinking processes is gaining importance because the development of a highly logical mind is a *sine qua non* of the modern scientific world and thus the most important goal of instruction also. Jean Piaget has contributed a lot regarding the modes of development of human thinking. He has concentrated mainly on the qualitative changes that take place in the thinking processes from time to time with the advancement of age and lead to the mental growth of an individual. Piaget has grouped these qualitative changes in thinking into four global stages of development, i.e. sensori-motor stage (birth to 2 years), pre-operational stage (2 to 7 years), concrete-operational stage (7 to 11 years) and formal-operational stage (11 to 15 years). Later on, he hypothesized the extension of formal-operational stage up to 20 years of age as diversification of aptitudes during this period. Another important feature of Piaget's theory is that it has always stressed on the study of the structure of human thinking than its function and content.

The present study was undertaken with a view to investigate the structure of thinking at formal-operational stage—the most important period from the point of view of instruction. Since there is a sufficient research evidence that in majority of the cases adolescents at the age level 11 to 15 years do not attain the level of formal thought in the true Piagetian sense, the term adolescent thought has been used to describe the thinking of the adolescent at this age which shows a form of grouping of concrete-operational and formal-operational thought. The effort has been made through this study to analyse the adolescent thought, mathematically using the factor analytical technique to identify its

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underlying structure and to explore the extent of the relationship, of the development of adolescent thought with age, sex, intelligence, academic achievement, reasoning ability, space relations, adjustment and 14 dimensions of personality.

Hypotheses

In the light of the related research studies reviewed, the following hypotheses were proposed to be tested through this study:

1. The preformance on Piaget-type tasks increases with age during the formal-operational period
2. Boys and girls perform equally well on Piaget-type tasks.
3. The measures of intelligence, both verbal and non-verbal, correlate significantly with the measures of the dimensions of adolescent thought.
4. There exists a significant relationship between the measures of academic achievement and the variables of the dimensions of adolescent thought.
5. The measures of reasoning ability and space relations yield a significant correlation with the various measures of adolescent thought.
6. The measures of adjustment is significantly related to the performance on Piaget-type tasks.
7. The measures of personality exhibit significant relationship with the measures of the dimensions of adolescent thought.
8. The performances on Piaget-type tasks form an interrelated measure of the adolescent thought and exhibit a unifactor structure
9. The measures of intelligence, academic achievement, reasoning ability, space relations, adjustment and other personality traits cluster in specific constellations with the measures of the dimensions of adolescent thought explaining thereby the common factor variance.

Sample

A sample of 986 students (505 boys and 481 girls) was drawn randomly from the students of 12 high schools of rural areas in Punjab taking almost equal number of boys and girls from the age-groups of 11⁺, 12⁺, 13⁺, 14⁺, and 15⁺ and studying in Classes VI, VII, VIII, IX and X, respectively.

Tools of Research

The data were collected using the following tools .

1. Test of Piaget-type Tasks (author)
2. Culture Fair Intelligence Test-Scale 2 (Cattell and Cattell)
3. General Mental Ability Test (Jalota)
4. Reasoning Ability Test (Dubey)
5. Space Relations (DAT) (Bennett, *et al.*)
6. Adjustment Inventory (Asthana)
7. High School Personality Questionnaire (Gattell and Beloff)
8. Academic Achievement in Five School Subjects (from school records).

Statistical Treatment of Data

To identify the factorial structure of adolescent thought, data on the 34 measures were put into 34×34 correlation matrix and subjected to factor analysis by principal axes method with varimax rotation. The computations were carried out through 'REYAD-1022 computer' at Computronics India, New Delhi, using PA-1 factor analysis programme from the statistical package for the social sciences (SPSS) by Nie, *et al* (1970). The relationship between the measures of adolescent thought and the other independent variables were worked out by computing product-moment coefficients of correlation. The one-way analysis of variances technique was used to determine the age and sex differences regarding the performance on Piaget-type tasks.

Conclusions

1. The performance of adolescents on Piaget-type tasks increase with age during the formal-operational period.
2. The performance of boys on some of the Piaget-type tasks at certain age levels is superior to that of girls while there is no significant difference in the remaining cases.
3. The measures of intelligence, both verbal and non-verbal, correlate significantly with the measures of adolescent thought in the positive direction.
4. The academic achievement is having a significant positive relationship with the measures of adolescent thought.
5. The measures of reasoning ability and space relations prove to be some of the determinants of the development of adolescent thought.

6. The development of adolescent thought leads to the better adjustment of the individuals or vice versa.
7. Personality traits like outgoing tendencies, abstract thinking, emotional stability, phlegmaticism, obedience, conscientiousness, adventurousness, feeling of security, self-discipline and relaxedness go with the development of adolescent thought whereas reserveness, concrete thinking, emotional instability, excitability, assertiveness, expedience, shyness, feeling of insecurity, uncontrollability and tenseness go with the non-development of adolescent thought
8. The performance on Piaget-type tasks forms an interrelated measure of adolescent thought which exhibits an unifactor structure.
9. Eight significant factors extracted through factor analysis account for 49 per cent total variance, and are named as: general intellectual factor of adolescent thought, academic achievement factor, adjustment factor, behavioural factor, emotional factor, temperamental factor, group factor of adolescent thought and social factor.



The Use of Programmed Instruction in Mathematics Teaching at the Primary Level

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THE PROGRAMMED instruction is a recent development in the field of classroom and distance education. The chief credit of its practical use in the classroom and different situations of instruction goes to Skinner (1954) who defined programming as a process of arranging

*Thesis submitted to Patna University (1980)

materials to be learnt in a series of small steps designed to lead a learner through self-instruction from what he knows to what he is expected to know. At each step, the learner is reinforced by his correct responses made overtly. Thus, the new technique is a process of teaching and learning within which the pre-established subject-matter is broken down into small, discrete steps, and is carefully organized into logical sequences in such a way that it can be readily learnt by the student.

Many researchers have tried to compare the effectiveness of programmed text with the traditional method of teaching. Klause (1960), Jacob *et al.* (1965), Huang (1973), and others found programmed instruction significantly superior to traditional method of teaching for achievement. However, no significant difference in achievement in favour of the programmed text was reported by Senter *et al.* (1966), Sherman (1974), and others. In India, Sarkar (1969) and Patel (1978), found programmed instruction significantly superior to traditional method of teaching while Shah and Kapadia (1974) found it equally useful. Thus, the investigators do not seem to be unanimous over the positive effects of programmed instruction.

Purpose

The purpose of the present study was to see the relative effectiveness of traditional method of teaching without home assignments and grading, programmed text, and traditional method of teaching with regular home assignments and grading for which the following hypotheses were proposed to be tested :

1. There is no difference in achievement among groups taught through traditional method without home assignments and grading, programmed text, and traditional method of teaching with home assignments and grading.
2. There is no difference in retention among groups taught through traditional method without home assignments, programmed text, and traditional method with home assignments and grading.
3. There is no difference in achievement of students coming from high-income group and those coming from low-income group and taught through traditional method without home assignments, programmed text, and traditional method with home assignments and grading.
4. There is no difference in retention of students coming from high-income group and those coming from low-income group

and taught through traditional method without home assignments, programmed text, and traditional method with home assignments and grading.

Method

The sample of the present study consisted of 60 students of Class IV studying in Central School, Samchi (Bhutan). All the 60 students were randomly divided into three equivalent (homogeneous groups with respect to prerequisites and age) groups and each one of the groups was assigned randomly to one of the three treatments, viz. (i) control group following traditional method of teaching without home assignments, (ii) experimental group I following programmed text, and (iii) experimental group II following traditional method with home assignments and grading. The investigator developed programmed text in mathematics for Class IV covering the subject areas. mathematical symbols, fractions, decimals, percentage and mathematical statements. The text contained 2,557 frames divided into 30 units to be covered in 30 working days. At the end of each day's work a post-test was given to each of the groups. After a gap of four weeks, a retention test was administered to all the three groups. The subjects were further divided into high and low income groups in accordance with the income of their parents.

Significant Findings

1. The experimental group I was significantly superior to the other two groups in respect of immediate achievement. However, the control group and experimental group II showed no significant difference in their immediate achievement.
2. The subjects of experimental group I following the programmed text were significantly superior to the subjects of the remaining two groups. However, the difference in the means of subjects of control group and experimental group II could not come to be significant.
3. The income and interaction did not affect achievements.
4. Methods, income of parents, and interaction did affect retention of the subjects.

Conclusions

It may be concluded from the above that the high-income group students who followed the programmed text appeared to be significantly

superior (at 0.01 level) to high and low-income group students following the traditional method without home assignments and low-income group students following the traditional method with home assignments and grading. It was further concluded that low-income group students following the programmed text appeared to be significantly superior to high and low-income group students following the traditional method without home assignments and low-income group students following the traditional method with home assignments and grading.

Suggestions

The results discussed here have amply established that the programmed instruction holds promise for improving instructions in the teaching of mathematics. It is a fact that schools in Bhutan lack in trained and qualified teachers which may be off-set in two ways: (a) existing teachers can work more effectively by encouraging individualized study, and (b) programmed text can be disseminated in the areas where teachers are not available. Thus it is suggested that:

1. Programmes may be developed and used as text and help-books.
2. Studies with programmed text may be undertaken in different school subjects.
3. Well-developed programmed text may be tried in rural, urban, industrial and tribal set-up.
4. The approach may be tried in other technical disciplines like engineering, medicine, agriculture, etc. and also in non-formal education.



A Study of the Role of the Central Advisory Board of Education in Relation to the Development of Primary Education in India, 1947-74

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NOTWITHSTANDING the constitutional provisions which make education primarily a 'state' subject, education is a matter of national concern. Decision-making in this field has, therefore, emerged as a centre-state partnership during the last 28 years. The Central Advisory Board of Education (CABE) was established as a consultative machinery for consultation and cooperative decision-making in education at the national level in 1921. It was abolished in 1923 on grounds of economy and revived in 1935. Ever since the revival of the board, diametrically opposed views have been expressed by a number of dignitaries, including a few members of the board, about the utility of this consultative device in centre-state relations in education.

The present study attempts to make an assessment of the role effectiveness of the board in relation to the development of primary education in India as well as in the two states of Andhra Pradesh and Kerala during the period 1947-74.

The Objectives

The specific objectives of the investigation were :

1. To study the recommendations of the CABE relating to some of the important problems of quantitative expansion and qualitative improvement and some other allied problems of primary education.
2. To ascertain the extent of the influence of the board in the implementation of its recommendations on the central and state governments.

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3. To critically examine the implications of the changes in the membership composition and working procedures of the board for the development of education in general and primary education in particular.
4. To suggest improvement in the role effectiveness of the board.

The Procedure

The study was made in historical perspective with emphasis on the problem-oriented approach. The presentation was both descriptive as well as analytical. The primary sources of data for the investigation consisted mainly of agenda papers and proceedings of the meeting of the CABB and of its *ad hoc* and standing committees on primary/ basic education and other relevant reports and documents. The secondary data consisted mainly of the published books, research papers, articles, reports of non-official conventions and conferences and newspaper reports as well as editorial comments on relevant matters relating to the period under study.

Three tools were developed for the purpose of this study, namely, a questionnaire, a structured interview schedule and an observation schedule. The questionnaire was administered to a cross-section of 100 official and non-official members of the CABB selected according to the systematic sampling procedure. The questionnaire was developed to elicit opinions of the selected members on the CABB's membership composition and its mode of functioning. The questionnaire also sought their suggestions for improvement in the board's functioning. The structured interview schedule was prepared to supplement and to corroborate the questionnaire responses and to elicit responses to certain unresponded questions. The observation schedule was framed for direct observation by the investigator of the conferencing practices adopted by the CABB, the extent of participation in the deliberations by the members, and the quality of discussion taking place in the meetings.

Important Findings and Conclusions

Some of the notable findings and conclusions of the study were as follows :

1. The CABB followed a policy of drift by shifting its stand frequently on the target of universalization of primary education. The

target date during the period under study was shifted at least 6 times . first to 1966, then to 1976 and again to 1981, 1984, 1985 and 1986.

2. The CAFE made important recommendations to tackle the problems of universal provision of schools, universality of enrolment, wastage and stagnation, education of girls, education of scheduled castes and scheduled tribes, provision of physical and other facilities, professional preparation and growth of teachers, improvement in the remuneration and service conditions of teachers, improvement of curriculum and supervision.

3. The board also adopted significant resolutions on certain aspects of basic education during the period 1947-66. The board softened its attitude towards certain controversial aspects of basic education. For example, it recommended the introduction of English in senior basic schools to facilitate admission of the products of basic schools into high schools; it advised the state governments to adopt the traditional methods of teaching to make good the deficiencies in the principle of correlation; and it resolved that the productive aspect of basic education should not be allowed to take precedence over the educational aspect. However, the board's decision to drop the term 'basic education' from the Draft Statement on National Policy on Education meant acquiescing to the proposal of the Education Commission (1964-66). The stand taken by the board on this important issue was, therefore, inconsistent. The scheme of basic education which had been launched with great fanfare after independence on the initiative of the CAFE was ignominiously discontinued and, that too, at the behest of the board itself

4. The board made repeated pleadings for assigning higher priority to education vis-a-vis other sectors of development and to primary education vis-a-vis other sub-sectors of education. The recommendations of the board in this respect were, however, not accepted because of certain compulsions.

5. The board's recommendations of the relationship between the state governments and local bodies in the administration of primary education did not help in satisfactorily solving the problems arising from the introduction of democratic decentralization of primary education. Of these problems, most important one was the victimization of teachers by the authorities of Panchayati Raj institutions.

6. The size of membership of the board increased from 14 in 1921 to 24 in 1935 and to 78 in 1974. The composition of the board also underwent a noticeable change during the period 1935-74 registering an increase in all categories of the board's membership. The central government representatives increased from 1 to 4, the representatives of the

state governments and union territory administrations from 10 to 25, elected members from 3 to 6; ex-officio members from 1 to 17; and members nominated by the Government of India from 6 to 19. The change in the membership composition tilted the balance in favour of the central government thus diluting the federal character of the board.

7. The mode of functioning of the board left much to be desired in terms of the nature of the agenda, ground-work done for the board's meetings, frequency and duration of the meetings, conferencing practices and working procedures.

8. During the period under study, the same problems of primary education were discussed year after year by the board, so that its recommendations became repetitive in character.

9. No specific pattern for selecting the problems of primary education for discussion was followed in the various meetings of the board.

10. The recommendations made by the board were comprehensive enough covering all aspects of primary education, although the stress laid on some aspects was more than on others.

11. The role played by the board in the development of primary education was 'responsive' rather than 'promotional'. The board responded to the current educational thoughts on different aspects of primary education generated within the country as well as abroad.

12. An economically advanced state like Kerala was found to be in a better position to implement the recommendations of the board unless it was unwilling to execute a particular recommendation either on financial or ideological grounds. On the other hand, an economically backward state like Andhra Pradesh, if left to itself, could not implement the board's recommendations adequately unless liberal financial assistance was provided to it by the Centre.

13. In spite of various inadequacies which have retarded efficient functioning of the board, there is need for such a body in a federal country like ours. The federal set-up necessitates a policy of persuasion rather than imposition from above and from that point of view a body like the CABB is an important prerequisite. In order to make the board a more functional and effective organization, it needs to be revitalized in terms of its structure and functioning.



An Experimental Study of the Relative Effectiveness of Three Methods of Instruction : Exposition Method, Programmed Learning Method and Multi-media Method in Science Education

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THE SURVEY of related literature has a clear inkling that the field of science education is quite susceptible to researches on various issues related to teaching methodology in general and experiments with regard to programmed learning and multi-media in particular. There is a great dearth of programmed material in biological sciences. Moreover, the controversy regarding the effectiveness of the programmed learning method over the other methods in science education is still prevailing. Hence it seems to be quite in line with the requirements that good programmes in biology are developed, validated and given a trial as method of teaching in ordinary classroom situations and also as supplementary reading materials.

Objectives

The objectives of the present study were

1. To investigate the relative effectiveness of the three methods of instruction, viz expository method, programmed learning method and multi-media method.
2. To study the relative retention in learning through expository method, programmed learning method and multi-media method.
3. To develop a programme in branching style on the selected unit of content in biology.
4. To develop a multi-media text on the same content which has been programmed.

*Thesis submitted to Kurukshetra University (1979)

Hypotheses

The investigator has formulated the various research hypotheses:

1. The multi-media method is more effective in learning than either of the programmed learning method and expository method.
2. The multi-media method is more effective in retention than either of the programmed learning method and expository method.
3. Programmed learning method is more effective in learning than expository method.
4. Programmed learning method is more effective in retention than expository method.

Delimitations

1. The experiment was restricted to a group of male students of high school classes in the local colleges of Saharanpur city.
2. The programme was prepared on the three units of content of biology for high school classes : Excretory system of frog, reproductive organs of frog and the life history of frog.
3. The content was programmed in branching style.
4. The programme was developed in Hindi version only.
5. The experiment was restricted to a researcher-prepared programmed booklet, multi-media teaching material and criterion test.

Development of Experimental Material

The main objective of the study was to compare the relative effectiveness of the three methods of instruction. In order to achieve this objective appropriate experimental material was required. One of them was programmed learning material developed by the investigator himself. The programme was evaluated and revised in terms of individual group try-outs and field-testing. The error rate of the programme was found to be 4.52. The criterion test was constructed for evaluating the programme. The reliability of the criterion test was estimated by simplified Kuder Richardson-21 formula and by lengthening three times by using Spearman-Brown prophecy formula. The content validity was checked by analysing the criterion test items with regard to programme frames. It was quite satisfactory.

The multi-media material was also prepared by the investigator on three units of content. Further, each unit was divided into three parts—A, B and C, respectively, on the basis of logical sequence of the content and convenience of presentation and also on the basis of discussion with media experts, educationists and biology teachers. The multi-media material was revised and evaluated on the basis of group try-outs and the views of media experts and subject experts. The expository lecture was prepared by the investigator himself with the cooperation of the biology teacher

Design of the Study

The pre-test-post-test multifactor experimenting method was used. In this experiment 3×2 factorial design was employed for studying the relative effectiveness and interaction effect between methods and two levels of intelligence. The sample of the study consisted of all the male biology students of Classes IX and X of all the intermediate colleges of Saharanpur city. Two such colleges out of eight were selected randomly. All biology students of high schools of these two colleges were included in the sample. In this way cluster random sampling technique was used. The subjects ranged between 14-16 years age-group and belonged to urban areas. In all, 180 students—120 from one institution and 60 from another institution—were selected for the study.

Significant Findings

1. It was observed from the data obtained that the F-ratio for methods was significant while for intelligence and interaction not significant. It may be interpreted that the three methods differ significantly in their effectiveness.

2. The value of PLM \times MM was found significant, indicating thereby that the two methods differed significantly. Further, mean score of the individual placed in MM was greater than the individual of PLM group. Hence it can be interpreted that the individuals learn better by MM than PLM.

3. The value between PLM and EM was found significant at .01 level. Similarly, the t-value between MM and EM was also found significant.

4. There is a significant difference between three methods on difference scores. PLM and MM differed significantly on difference scores, hence on retention. Further, the mean difference score of the subject placed in PLM group is greater than means difference scores of MM group.

Tools. For the measurement of intelligence Tandon's group test of general mental ability (English version) was selected because of its feasibility keeping in view the proposed sample. Intelligence tests in Hindi or Urdu version were not considered due to lingual differences among the subjects. For the measurement of frustration Rosenzweig's picture-frustration test (1944) in original form was selected and for assessment of introversion/extraversion and neuroticism Eysenck's (1959) MPI in original form was selected.

Administration. The three tests were administered individually to all 150 subjects. Each subject was given three tests with an interval of 10-15 minutes between each test. These tests were administered according to standard instructions and the data was arranged in various tables after converting raw scores into standard score units as prescribed in the test manuals.

Statistical Analysis

In view of the objectives of the study the investigator made a comparative analysis of the data of engineers, doctors and university teachers under the three factors, i.e. intelligence, degree of frustration and introversion/extroversion and neuroticism. Mean and standard deviations were calculated for all the three professional groups in the areas mentioned above. These are shown in Table 1.

The analysis of variance (3×3 form) was computed for establishing differences among the means of engineers, doctors and university teachers in intelligence, level of frustration and introversion/extraversion and neuroticism. The F-ratio and t-test is shown in Table 2 against engineers, doctors and university teachers in the areas which were under investigation.

Discussion and Interpretation

The data collected on the three professional groups in the areas which were included in the present research were processed for analysis and inferences while keeping in view the three hypotheses. Firstly, inferences were drawn among engineers, doctors and university teachers in the area of intelligence. By applying analysis of variance it was found that the mean scores of engineers, doctors and university teachers demonstrated significant differences as shown in Table 2. Engineers compared to doctors and university teachers were found to be superior in intelligence with a mean IQ of 73.56 which is significant at .01 per cent

TABLE 1

MEAN AND STANDARD DEVIATION OF ENGINEERS, DOCTORS
AND UNIVERSITY TEACHERS IN INTELLIGENCE, LEVEL OF
FRUSTRATION AND DEGREE OF EXTRAVERSION AND
NEUROTICISM

<i>S No</i>	<i>Variable</i>	$\frac{M}{\sigma}$	<i>Engineers</i>	<i>Doctors</i>	<i>University Teachers</i>
1.	Intelligence	$\frac{M}{\sigma}$	73.56 5.7	70.92 6.2	68.1 7.0
2.	Extraversion	$\frac{M}{\sigma}$	44.96 10.5	50.14 11.6	51.54 9.0
3.	Neuroticism	$\frac{M}{\sigma}$	45.5 7.7	46.8 9.7	47.6 8.8
4.	GCR	$\frac{M}{\sigma}$	66.46 10.0	62.08 11.0	57.6 10.5
5.	O-D	$\frac{M}{\sigma}$	19.76 9.0	21.38 10.4	26.38 9.9
6.	E-D	$\frac{M}{\sigma}$	52.26 12.5	49.5 10.15	49.48 10.60
7.	N-P	$\frac{M}{\sigma}$	29.8 8.6	27.9 8.8	22.42 8.5
8.	E-A	$\frac{M}{\sigma}$	32.3 10.4	37.2 12.4	36.8 9.0
9.	I-A	$\frac{M}{\sigma}$	29.03 9.2	31.4 9.4	33.0 10.2
10.	M-A	$\frac{M}{\sigma}$	38.0 11.2	31.2 10.6	29.6 9.0

TABLE 2

TABLE 2
COMPARATIVE ANALYSIS OF ENGINEERS, DOCTORS AND UNIVERSITY TEACHERS IN INTELLIGENCE,
LEVEL OF FRUSTRATION AND DEGREE OF EXTRAVERSION AND NEUROTICISM

LEVEL OF FRUSTRATION AND LEVEL OF

S. Variable No.	Value of "F" "F" Sig.				Value of "D"				Difference of Means between				Significance of Difference of Means between				Results
	at .01 Level		at .05 Level		at .01 Level		at .05 Level		Engineer Doctor		Engineer Doctor		Engineer Doctor				
	Obtained Value of "F"	at .01 Level	at .05 Level	or Insig.	SEd	at .01 Level	at .05 Level	Engineer Doctor	Teacher Teacher	Engineer Doctor	Teacher Teacher	Engineer Doctor	Teacher Teacher				
1. Intelligence	9.2	4.75	3.06	Sig.	1.26	3.28	2.49	2.64	5.46	2.82	Sig at .01 level	Sig at .05 level	Sig at .01 level	Sig at .05 level	Engineer>Doctor at Engineer>Teacher Doctor>Teacher .05 level Eng.>Dr.>Teacher		
2. Extraversion	5.25	-Do-	-Do-	Sig.	2.12	5.5	4.19	5.18	6.58	1.4	Sig. at .01 level	Sig. at .05 level	Insig.	Insig.	Teacher>Engineer Doctor>Engineer		
3. Neuroticism	0.71	-Do-	-Do-	Insig	-	-	-	-	-	-	-	-	-	-	Engineer>Doctor Engineer>Teacher Doctor>Teacher		
4. GCR	8.2	-Do-	-Do-	Sig	2.19	5.71	4.33	4.4	8.8	5.52	Sig. at .01 level	Sig. at .05 level	Sig. at .01 level	Sig. at .05 level	Engineer>Teacher Doctor>Teacher Eng.>Dr.>Teacher		
5. O-D	5.69	-Do-	-Do-	Sig	2.04	5.32	4.03	1.62	6.62	5.0	Insig	Insig	Sig. at .01 level	Sig. at .05 level	Teacher>Engineer Teacher>Doctor .05 level		

6. E-D	1.53	-Do-	-Do-	Insig.	-	-	-	-	-	-
7. N-P	6.9	-Do-	-Do-	Sig.	2.06	5.37	4.07	1.9	7.38	5.48
										Engineer>Teacher Sig. at .01 Sig. at .01 and Doctor>Teacher .05 level .05 level
8. E-A	3.04	-Do-	-Do-	Insig.	-	-	-	-	-	-
9. I-A	5.82	-Do-	-Do-	Sig	1.84	4.80	3.64	2.3	3.9	1.6
										Insig. Sig. at Teacher>Engineer .05 level
10. M-A	8.9	-Do-	-Do-	Sig	2.1	5.5	4.15	6.8	8.4	1.6
										Engineer>Doctor Sig. at .01 Sig at .01 and Insig. Engineer>Teacher .05 level .05 level

level. The difference between engineers and university teachers in their mean scores is 5.46, which is significant at 01 per cent level and the difference between doctors and university teachers is 2.82 which is also significant at .05 per cent level.

As for the scores on extraversion, it was observed that university teachers compared to engineers and doctors are more extrovert. The mean scores of the three professional groups are 51.54, 44.96 and 50.14, respectively. The difference between engineers and doctors and engineers and university teachers are significant at .05 per cent and .01 per cent levels, respectively. There were no significant difference between doctors and university teachers in the area of extraversion.

As for the degree of neuroticism, the three professional groups were found to be alike in this area. The mean scores of engineers, doctors and university teachers are 45.5, 46.8 and 47.6, respectively and these differences are insignificant.

While studying the level of frustration with the help of Rosenzweig picture-frustration cartoons, the investigator found that group conformity rating (GCR) score among engineers compared to doctors and university teachers was the highest and doctors compared to university teachers had also a higher GCR score. This reveals that university teachers compared to engineers and doctors are more frustrated, and doctors compared to engineers are slightly frustrated as shown in Table 2.

Besides the analysis of the three professional groups, the investigator also worked out the differences among engineers, doctors and university teachers in the type and direction of aggression under obstacle-dominance (O-D), ego-defence (E-D), need-persistence (N-P); extraggression (E-A), introgression (I-A) and imgression (M-A). In the type of aggression, university teachers dominate by projecting their frustration on the environmental obstacles, whereas engineers dominate in projecting their frustration by demonstrating their persistence to solve their problems (N-P). None of the three professional groups has shown any significant difference in the area of ego-defence (E-D).

Under direction of aggression, which is demonstrated by Extraggression (E-A), introgression (I-A) and imgression (M-A), engineers compared to doctors and university teachers have again demonstrated higher degree of imgression (M-A), i.e. capability to gloss over the frustrating situation. University teachers compared to engineers and doctors have demonstrated a higher degree of introgression (I-A), which shows that teachers blame their own lot for impending frustrating situations. No significant differences were found in extraggression (E-A) among the three professional groups.

The hypothesis 1, that engineers, doctors and university teachers differ significantly in the area of intelligence is established. Engineers have been found to be superior compared to doctors and university teachers. The differences have been found to be significant at .01 and .05 per cent level. These results are in line with Pal (1969). The author in his research on professional students has established that engineering students compared to doctors and university teachers have a superior intelligence and creativity. To account for the differences in intelligence among the three professional groups, it is observed that engineers and doctors, by and large, enter the profession on the basis of their performance in all India/regional competitive examinations. University teachers generally comprise those medical and non-medical students, from other disciplines, who for some reasons have not been able to enter medical, engineering or other competitive examinations. This may be one of the possible reasons for higher degree of intelligence among engineers, doctors as far as the present study is concerned.

In view of the professional affiliation of the three sub-groups, in the study, the investigator has observed that there are significant differences in the level of frustration among engineers, doctors and university teachers. University teachers as compared to engineers and doctors have demonstrated a higher degree of frustration and engineers as compared to doctors and university teachers have demonstrated only a slight degree of frustration. The higher level of frustration among university teachers may be ascribed to perpetual professional and social competition of this group, which they endeavour as compared to engineers and doctors. The significance of differences in the level of frustration among engineers, doctors and university teachers is established.

While studying introversion/extraversion the results of this study have shown that university teachers are more extrovert as compared to engineers and doctors. This may be ascribed to professional expectations and social interaction of the three professional groups compared to engineers and doctors. University teachers face themselves with the cross-section of students, due to which they are expected to be disposed in a more extrovert manner.

The differences in the neuroticism have been found insignificant which indicate that the three professional groups have rational and reality-oriented approach towards their personal and social problems. This has also been established through GCR on picture-frustration test. The hypothesis that university teachers as compared to engineers and doctors are more extrovert is also established.

The present investigation offers a host of questions which merit further investigation. These include pre-and post-professional entrance study of engineers, doctors and university teachers in intelligence, level of frustration, extraversion/introversion and neuroticism. Further, engineers and doctors who are engaged in teaching and research in the professional colleges could be a better sample for a comparative study with university teachers.

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An Investigation into the Study Habits of 10 to 12 Years of Children with Regard to Their Parental Profession

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IT is universally acknowledged that one of the most important objectives of education is the qualitative improvement in the adjustment ability of the individual by developing a distinctive life-style and good habits of work. The individual can only contribute to the betterment of society when his inherent potentialities are maximally developed. Through the process of learning we can develop humanly qualities in the individual. Learning as a matter of fact is the formation of habits. Habits are formed, learned and developed in a planned way. Our behaviour to a great extent is controlled and shaped by the habits we develop in the course of development. So it becomes essential for parents and educators to develop good habits in children for adequate adjustment.

James, a famous psychologist, has referred to habits as the fly-wheels of a society. If we examine individuals, we find that our behaviour is directed and controlled by habits. Habits are, no doubt, important and play crucial role in shaping the personality of the individual but they should not be allowed to dominate least the individual becomes their victim. The period between 10 to 12 years of age is an important phase in human life span, when old habits are broken and new ones are formed. It is important to know what type of habits are formed and what variable operate in the formation of habits

Keetz (1979) conducted a study on 182 students entering Freshmen West Chester College (USA) to investigate (a) the relationship between social position and level of study habits, and (b) the prediction of study habits by the addition of two family correlates (birth order, and family size) to social position. None of the variables had significant value in predicting the study habits. Tuli (1980) in a study entitled 'study habits as correlates of achievement in mathematics' concluded that study habits are correlates of achievement in mathematics

Need of the Present Study

The habit of reading is an important factor in the later childhood because this is the terminal point when children enter adolescence and the formation of good habits at this stage will make or mar the future of children. If the reading habits in later childhood are properly patterned, definitely they will economize time and energy of the individual. The investigators surveyed the available literature on the study habits of children but no study was available on the study habits with regard to parental profession in the age of 10 to 12 years. The study was taken up with an another important objective to explore the study habits of girls in later childhood. It was implicitly assumed that the present study will be able to establish relationship between the professional status of parents and the study habits of their children.

Objectives

The following are the specific objectives of the present study:

1. To find out the general pattern of study habits of children between the age level 10 to 12 years.
2. To find out the difference in the study habits of boys and girls.
3. To find out the pattern of study habits of children in relation to parental profession.

Hypotheses

1. The study habits at different age levels will differ significantly.
2. There is no difference in the study habits of boys and girls.
3. There is no effect of the nature of the parental profession on the study habits of children.

Sample

The present study was conducted on 500 children from age levels 10 to 12 years. The sample was drawn from the primary, middle and high schools of Hamirpur and Simla districts of Himachal Pradesh. Thirty students from different age-groups (10 to 12 years) were taken up for study. Both boys and girls from rural as well as urban areas were selected randomly. Children with five types of parental professions (agriculture, government service (civil), business, teaching and defence services) were selected for the study.

Tools of Data Collection

In the present study, the study habits inventory (Hindi version) developed by Bhai Lal Bhai and V. Patel was used. There are 45 items in all, which depicted seven major areas: home work, work organization, reading organization of habits, preparation for examination, general habits and interests and environment of the institution.

Analysis and Interpretation of the Data

To find out the pattern of study habits of children from 10 to 12 years, mean scores at each of these age levels were calculated which are 169, 174, 173, respectively, for urban population. According to the manual of this inventory these scores fall in Grade C, i. e. of average study habits. The mean scores for rural population at the same age levels are 144, and 157, 155 which fall in Grade D, i. e. of study habits below normal. To find out the effect of sex of children on the study habits of children, analysis of variance method was applied separately for rural and urban population.

The F-value for sex is 0.97 for rural population whereas the table value at .05 and .01 level is 3.99 and 7.09, respectively. Since the calculated value of F is much less than the table value both at .05 and .01 level of significance, we accept the null-hypothesis that there is no difference in the study habits of boys and girls.

The F-value for sex for urban population is 0.52 whereas the table value at .05 and .01 level of significance is 3.99 and 7.09, respectively. The calculated value of F for sex is much below the table value even at .05 level of significance, hence the null-hypothesis that there is no difference in the study habits of boys and girls is accepted.

To know the effect of parental profession on the study habits of children, analysis of variance for the one-way classification was used. Only 25 cases were taken for analysis under each profession. Calculations are given below:

Source	df	SS	MS (V)
Among the means	4	3361.3	840.33
Within conditions	170	48817.3	283.16
Total	174	52178.6	
$F = \frac{840.33}{283.16} = 2.92$ Table values			
		.05 levels 2.43	.01 levels 3.44

Since the observed value of 'F' exceeds the table value at .05 level and not at .01 level of significance, the null-hypothesis that there is no effect of the nature of the parental profession on the study habits of children is rejected. Keeping other factors constant, the parental profession affects the study habits of children. To further analyse the effect of parental profession on the study habits of children, mean scores for each profession were also calculated: agriculture = 156, government services (civil) = 163, business = 160, teaching = 171, and defence services = 161. The mean scores of children whose parental profession is agriculture fall in the category D, i.e. their study habits are below average. The mean score of children with parental profession in business fall slightly above the category D, i.e. they possess average study habits. The mean scores with all other professions fall in category C, i.e. they possess average study habits. Children of teachers achieved the highest score on the study habits inventory, next comes the government and defence services, respectively.

Suggestions for Parents and Teachers

The following suggestions if faithfully implemented will definitely

prove helpful in inculcating sound study habits in the children. The parents and teachers may help children in the following ways:

1. Environment is one of the most effective variables which greatly influences the development of an individual's personality. Hence the environment plays an important role in creating interest for any specific activity. It is the duty of the parents to create conducive atmosphere in home which may develop good habits of study.
2. Parents may provide guidance in the selection of appropriate literature and books for study to the children.
3. In the development of habits, parents may impress upon their wards the need and importance of regularity and punctuality.
4. Teachers should tell children, how to use dictionary.
5. Teachers should encourage students that along with class notes they must read textbooks also.
6. Parents should give adequate time to children for study because the children, mostly girls from rural areas, responded that they get less time for study due to home work.
7. Schools should make adequate provision for library facilities.

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The Correlates of Change-proneness of Secondary School Teachers

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KNOWLEDGE utilization research is continuously confounded with two kinds of problems : One is the issue of time-lag which primarily implies the lapse of time between the birth of an innovation and its actual implementation, rather internalization. In reality, the time-lag is linked with the kind of people in a society or a system which is to internalize innovation. The second issue is related to the people in a system with respect to any innovation. One always finds a group of people who jump at the innovation and put efforts to try and adopt. The other extreme is the group that nose down any change effort. Just as it is important to know why some (probably majority) people resist and reject innovations. It is also important to know why some people (that too in a minority) are so keen to experiment with innovation. Do these people really have a 'tendency' to try new ideas and practices to change old ways of working? If so, can such a tendency usually called change-proneness be explained with reference to some other known characteristics of the teachers and their surroundings with which they are in continuous interaction? Such academic and professional questions inspired the present research project.

Interestingly, an analysis of the major reviews of research in innovation diffusion, viz. Bhola (1965), Havelock (1973), Rogers and Shoemaker (1971), Mukhopadhyay (1975), draws a blank so far as research on change-proneness is concerned. The first mention of the concept was by Miller (1967). But actual research study on the problem was done first by Aggarwal (1974). She found that scores on the innovative proneness was significantly related to various dimensions of teachers' morale. The first significant contribution on the issue of change-proneness and its correlates came from Mukhopadhyay (1978). He studied

the relationship of 29 different characteristics of teachers with their change-proneness. In all, ten factors were found significantly related. Some of the important ones are satisfaction in teaching, rapport among teachers, consideration of the principal, rapport with principal, and rural-urban background. Using multiple regression analysis it was found that about 59 per cent variance of change-proneness could be explained by the cluster of 29 variables selected in the study.

Aims

The study aims at locating the variables or factors which are related to the innovative proneness of teachers. It intends to study whether the innovative proneness of the teacher is related to (i) the leadership behaviour of the principal, (ii) rapport with principal, (iii) rapport among teachers, (iv) satisfaction with teaching, (v) teaching load, (vi) school facilities and services, (vii) teacher's status, and (viii) innovation awareness. The operational definitions of these variables are as under:

1. *Change-proneness* has been defined as the readiness of the teachers to adopt an innovation, to experiment it, to share it with others and to make all efforts to make the innovation a success.

2. *Leadership behaviour of principal/headmaster* It means the assessment of the qualities of principal as leader which include initiative, consideration, democratic attitude and academic leadership.

3. *Rapport with principal* means the perception of the principal as a friend and guide which helps the teacher to work freely in the school.

4. *Rapport among teachers* stand for cohesiveness in the teachers as a group and the prevalence of feelings to share ideas with other teachers.

5. *Satisfaction with teaching* means self-assessment of a teacher in the classroom.

6. *Teaching load* means how does a teacher perceive the amount of work he has to undertake in the school.

7. *School facilities and services* means the perception of a teacher of the academic and non-academic facilities in the school.

8. *Teacher status* means the perception of his place in the society.

9. *Innovation awareness* implies the degree to which a teacher is aware of the new ideas and changes in his field.

Design

The sample for the study was selected from teachers of 11 secondary

schools of Bhopal city. All the teachers teaching Classes VII to XI of these schools were approached which amounted to 200. Only 102 teachers responded to all the items of all the tools, and as such only these many response sheets could be used. For judging the innovative proneness of teachers the change-proneness inventory (CPI) developed by Mukhopadhyay (1975) was used. For studying leadership behaviour of the headmaster, items from leadership behaviour description questionnaire (LBDQ) were used. Purdue teacher opinionnaire (PTO) which gives a combined score for teacher-morale but sub-scores for the ten components of teacher-morale was used. It gave scores on rapport with principal, rapport among teachers, satisfaction with teaching, teaching load, school facilities and services and teacher's status. After making a brief survey of the innovations in school teaching, a list of 14 innovations was prepared to judge teacher's awareness of innovations. The data on each item was scored by assigning weightage of 1 to 5 negative items and were scored in the reverse order. Mean and standard deviation were calculated for each of the variables. The product moment correlation technique was used for examining the relationship between change-proneness and other variables.

Results

The following Table gives information about the mean, SD and the value of 'r' for relationship with change-proneness of teachers.

TABLE
STATEMENT OF MEAN, SDs AND COEFFICIENT OF CORRELATION
BETWEEN SCORES ON CHANGE-PRONENESS AND OTHER VARIABLES

<i>S.No.</i>	<i>Variables</i>	<i>Mean</i>	<i>SD</i>	<i>Value 'r'</i>
1.	Leadership behaviour of the principal	39.27	8.98	0.409**
2.	Rapport with the principal	69.36	17.05	0.290**
3.	Rapport among teachers	49.94	11.43	0.00081
4.	Satisfaction in teaching	74.32	15.47	0.263**
5.	Teacher load	32.29	9.26	0.020**
6.	School facilities and services	14.51	5.30	0.441**
7.	Teacher status	18.33	4.17	0.350**
8.	Innovation awareness	41.62	8.36	0.99**

**Significant at .01 level

The above Table helps to draw certain inferences as to the factor which can enhance teachers' innovative proneness. Out of eight correlates studied six were found to be significantly related as mentioned below.

1 and 2. *Leadership behaviour of the principal and rapport with principal* Both these variables show significant positive relationship with teachers' proneness for change. It means that if the principal is sensitive to the difficulties of his staff members and bears a favourable attitude towards them, appreciate their work, maintains close contact with the faculty members, etc. he inculcates in his teachers a sense of security which is necessary for enabling the teachers to take initiative, make extra efforts and have an experimental attitude which are the components of change-proneness.

3. *Satisfaction with teaching.* The factor showed a positive correlation of .263 significant at .01 level. It implies that a teacher who is satisfied in teaching is likely to be more open-minded and enthusiastic. This is further corroborated by Mukhopadhyay (1978).

4. *School facilities and services.* This variable was also found to be significantly related to teachers' change-proneness ($r = .441$).

5. *Teacher status.* The scores for teacher status were found to be significantly related to scores on change-proneness ($r = .35$). It means that the acceptance of teaching as a profession by a particular society and a satisfactory standard of living can also contribute to change-proneness of teachers.

6. *Innovation awareness.* For the first time this variable has been studied in relation to change-proneness. The coefficient of correlation of 0.99 reveals a relationship very near to absolute value. By squaring the value 'P', it can be said that 98 per cent of variance of change-proneness can be explained by awareness of innovation. It implies that the first important factor is to make the teachers familiar with the innovations in the field. Then only they can be motivated to change.

Discussion

If one reviews the findings of this research study in comparison to studies by Agarwal (1974) and Mukhopadhyay (1978) one can find the effects of cultural setting on teachers' perception of different variables. These two studies were conducted on teachers from Gujarat, while the present study has been conducted in Madhya Pradesh. The two states differ in their economic status and cultural setting.

All the three studies including the present one, have common findings for the variables of leadership behaviour and rapport with principal

satisfaction with teaching and school facilities and services. These variables have been found to be significantly related to teachers' change-proneness. Perception of teaching load showed low correlation. But different results were found for the correlates of rapport among teachers and teacher status. Mukhopadhyay (1978) found rapport among teachers to be significantly related to change-proneness while this study did not show any significant relationship. It is difficult to explain this variation. Rai (1972) also found results similar to this study though in a different context. She found that teachers as a unit of diffusion process do not appear to be much affected by the perception of their own colleagues as compared to the effect of the perceptions of principals and students. This correlate needs further investigation. For teacher status, this study found significant positive relationship while Mukhopadhyay (1978) did not find any such relationship. This difference can be contributed to the character of local culture and society. Cross-cultural studies can further enlighten such results.

Conclusions

The present study validates and confirms that teachers' change-proneness is contextual. In other words, it depends heavily upon the atmosphere of the organization in which he/she works. The consistent finding of principal's behaviour related to teachers' change-proneness is an important pointer to the crucial role principals play or can play. Buch (1972) in another study pointed out the principal's role as crucial to school adaptability. The next important step to such correlational approach to change-proneness is to identify a group of innovative and change-prone teacher and study in depth their characteristics, preferably through approach.

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A Study of Creativity in Relation to Sex, Locality and School Subjects

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CREATIVITY is a cognitive variable and has been defined as an ability to bring something new into existence. Guilford (1959)

speaks of creativity as a form of intelligence. He has isolated a number of special abilities that are related to the creative process. Most of these abilities—flexibility, originality, and fluency with words, associations and ideas—are associated with divergent thinking. There are different aspects of creativity. It encompasses imagination, problem-solving, dreams, day-dreams, even logic and uses of these to bring forth something that has never existed before.

Many attempts have been made by the educationists and psychologists to find out the relationship between creativity and some other personality traits and cognitive abilities. The studies devoted to creativity were conducted by Getzels and Jackson (1962), Yamamoto (1964), Goldberg and Maccoby (1965), Edwards and Tyler (1965), Wallach and Cogan (1965), Torrance (1967), Datta (1967-68), Paramesh (1970), Jawa (1971), Raina and Shukla (1972), Raina (1974), Mehdi (1974), Maccoby and Jacklin (1974), Horn (1976), Conger (1977) and several others in past years. From the review of the related studies the researcher drew the conclusion that very few studies of this kind have been undertaken in the field of education and psychology in India and abroad. Hence, there is a real need to take up studies of the kind of the present study. For the purpose of this study the following hypotheses were formulated:

1. That creativity will differ in the male and female students.
2. That the rural-urban location of the schools is differentially related to students' creativity.
3. That there is difference in the degree of creativity found in science and arts students.

Methods

Sample: The sample of the present study consisted of 100 high school students. The sample was selected in terms of sex (male and female); locality (rural and urban) and disciplines (science and arts) in equal proportions. The sample was selected randomly from ten intermediate colleges of the district of Sitapur, U.P.

Tool: The verbal test of creative thinking of Baquer Mehdi was used for data collection. It measures creativity in terms of fluency, flexibility, and originality and has an acceptable degree of reliability and validity.

Scoring: Three types of scores, namely fluency, flexibility and originality were obtained. Raw scores in each of these categories were converted into scores which were then added together to give the composite creativity score.

Analysis and Results

Hypothesis 1: This hypothesis aimed at testing if there was any significant difference between the male and female students with regard to creativity. For each of these two groups of students separate frequency distributions of composite scores on verbal test of creative thinking were prepared. Means and SDs of these distributions were also computed. In order to test whether there was any significant difference on students' creativity between these two groups of the student t-test of significance was applied (Table 1).

TABLE 1

<i>Students</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>t-value</i>
Male	50	126.18	14.6	
Female	50	118.01	16.82	2.565

Table 1 reveals that difference between the two distributions is significant at .05 level. The mean creativity scores of male and female students were found to be 126.18 and 118.01, respectively. The mean creativity score of male students is higher than that of the female students. It may be said that male students in general are more creative than female students. Sex is found to be related to creativity of the students.

Hypothesis 2: This hypothesis aimed at bringing out the relationship that might be existing between the rural-urban location of the schools and the students' creativity. To test this hypothesis means and SDs of composite creativity scores for the students of rural and urban schools were computed and the t-test of significance was applied. The results are presented in Table 2.

TABLE 2

<i>Students</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>t-value</i>
Rural	50	103.7	18.04	
Urban	50	128.5	13.6	7.762

Table 2 reveals that the obtained t-value (7.762) is greater than the table value at .01 level of significance. It may be concluded that the rural-

urban location of the schools appears to be a factor of students' creativity. The mean creativity scores of rural and urban students were found to be 103.7 and 128.5, respectively. It may be said that in rural school students there is comparatively a lower level of creativity as against the students of the urban schools.

Hypothesis 3: To test this hypothesis the students of the sample were distributed into two categories—science and arts. Composite creativity scores, then, tabulated into separate frequency distributions and means and SDs were computed. In order to test whether there was any significant difference on students' creativity between these two groups of the students the t-test of significance was applied. The results are given in Table 3.

TABLE 3

<i>Students</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>t-value</i>
Science	50	136.82	12.1	
Arts	50	122.47	17.63	4.745

The t-test of significance has revealed that the two groups of the students differ significantly on creativity at .01 level of significance. The mean creativity score of science and arts students is found to be 136.82 and that of the arts students it is 122.47. It may be concluded from this that creativity is significantly more in science students than the arts students. The students of science and arts differ significantly on creativity.

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Book Reviews

Education in Andhra Pradesh

General and Technical Education in Andhra Pradesh. P. Ramachandra Pillai.
Edited by N. Venkataswamy. Monograph—46/Education Telugu Akademi,
Hyderabad, 1981, pp. vii + 181 (Paper). Price: Rs. 7.50.

THE MONOGRAPH under review attempts to present a bird's eye view of the growth and progress of education in the State of Andhra Pradesh during the last 25 years since 1956 when the State was formed into the present form, merging the Telugu-speaking districts of Telangana area of the former princely Nizam province with the then Andhra State consisting of eleven districts. The State thus consists of the Telangana area, which is relatively backward (the backwardness can be attributed to the long princely rule), coastal Andhra, which is relatively rich with fertile land and vast sea-coast, and the Rayalaseema which falls in between the other two divisions as far as socio-economic development is concerned.

According to 1981 census, the State has a population of 53.4 million, compared to 43.5 million in 1971. The per capita income of the State increased from Rs. 530 in 1960-61 to Rs. 648 in 1979-80 (at 1970-71 prices). The literacy rate increased from 24.5 (including 0-4 age-group) in 1971 to 29.9 in 1981, thus pushing down the position of the State from 22nd to 23rd in the 29 states and union territories of the country. However, the State is economically backward ranking among the 15 major states, 9th in per capita income and 10th in the poverty ratio, with 55 per cent of the population below the poverty line in 1972-73 and it is having the highest share in all-India unemployment (1977-78 next to Tamil Nadu. (Cf. Raj Krishna : "Inter state disparities in economic development", third G.L. Mehta Memorial Lecture, Bombay).

In the educational sector the country has experienced a phenomenal

expansion in quantitative terms and so did the State of Andhra Pradesh. The enrolment ratio at the primary level in the State increased from 58 per cent in 1956-57 to 77 per cent by 1978-79. It is worthy of our attention that the ratio increased consistently since 1956-57 from 57.94 per cent to 76.7 per cent in 1962-63. The ratio remained constant around 75 per cent up to 1966-67 and since then there has been a gradual decline up to 1975-76, when the ratio touched the level of 63.4 per cent. "This was an undesirable trend in any field of development", as the author rightly observed, more so in the field of primary education. The author attributes this phenomenon to several student agitations and severe drought conditions in the State. The enrolment ratio at middle level increased from 14 per cent to 30 per cent, and at secondary/higher secondary level from 8 per cent to 18 per cent during 1956-57 and 1978-79. The State has now six universities for general and professional education and one technological university. The monograph, however, fails to highlight that despite this phenomenal increase in enrolments, the growth itself is unbalanced—the average annual growth rate of enrolments at collegiate level is 12.1 per cent, while the rate of growth at primary level is 4.4 per cent, and 6.1 at middle and 11.9 at higher secondary level, that universalization of primary, not to speak of elementary, education is still an illusion, while about eight states in the country have crossed 100 per cent enrolment rates at this level; and that among the adults (of the age-group 15-35) in the State there are about 10.5 million illiterates according to Planning Commission (*Draft Sixth Five Year Plan 1978-83, Revised*) estimates. The State spends 25 per cent of the total revenue budget on education, while even poorer states like Bihar spends about 31 per cent. Equally inexplicable is that the State of Andhra Pradesh spends about Rs. 41 per capita budgeted expenditure on education (1978-79), which is substantially less than what many other states spend, e.g. the corresponding figures are Rs. 126 for Nagaland, Rs. 94 for Sikkim, Rs. 80 for Himachal Pradesh, around Rs. 70 for Kerala and Manipur, in between Rs. 50 and Rs. 70 for states like Punjab, Tripura, Meghalaya, Jammu and Kashmir and Gujarat, and in between 45 and 50 for Haryana, Karnataka, Maharashtra and Tamil Nadu.

The monograph under review is a good attempt in the sense that it compiles huge amount of data and presents it in neat tabular and graphic forms, and thus presents a detailed account of the educational developments in the State. While the monograph discusses several issues, there are several other issues that are omitted. For instance, the growth of illiterates in the State, the growth of non-participants in the schools, the problem of drop-outs, declining standards, salaries of the

teachers, private management, etc. have been completely ignored. The treatment given to issues like adult education, inequality in educational opportunities by sex and by caste groups, non-formal education, problems of autonomous colleges, etc. is inadequate.

A thorough critical evaluation of the new experiments such as the abolition of detention system at the school stage, and introduction of semester system at the university level would have added much to the richness of the monograph. It is not to say that no such attempt has been made at all. For instance, regarding the abolition of detentions at the school stage, the author notes that while the system is "quite laudable" in the implementation part, it has led to certain adverse tendencies. Further, it is also pointed out that the new experiment could eliminate stagnation and not drop-outs. Further details, say with respect to quality and standards in education, would have been more interesting.

On the whole, the monograph is of highly uneven quality. While the author made a neat presentation and interesting analysis of data regarding the school-level education, regarding the university-level education, teacher-training, administration, etc. the account is just informative, and with regard to finances, the author provides a completely blank picture.

A few points that could have easily been taken care of are as follows : (i) Effective literacy rates (ignoring the population of the age-group 0-4), which are available now, could have been used instead of general literacy rates. (ii) The tables should have been given appropriate titles. (iii) It is generally defined that elementary education refers to Class I to VIII (population age-group 6-14) and primary education to Class I to V (age-group 6-11). This distinction is not clearly maintained in the monograph, e.g. the caption of the table on p. 36 should have been 'growth of primary education' not 'elementary education'.

On the whole this is a very useful monograph, particularly in the context of very scanty material we have in this field. As a researcher, one can expect a more comprehensive volume to be brought out by the Akademi or by the Ministry of Education at regular intervals, if not annually, dealing with all aspects of education in the State.

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Reviewing Briefly

Academic Promise and Fulfilment. Rup Nagpal. New Society Publications, 14, Suvidha Bazar, Sarojini Nagar, New Delhi, pp. 137, 1981. Price : Rs. 48.

RUP NAGPAL's book is based on his Ph.D. dissertation submitted to IIT, Delhi in 1979. He adopted mainly three techniques for the collection of data. These techniques were: (a) psycho-social questionnaire, (b) personality tests and case history method, and (c) interviews. The author found case study method useful.

We all know who gets admitted to IITs and in particular to IIT, Delhi. While going into the reasons why certain students fell under the category of under-achievers he states, "Our results indicate that these variables of social class operate as selector variables for the students to compete for admission to the IIT but are not relevant to the performance of the student after he is admitted for studies". He makes a suggestion, which I believe ought to be taken seriously, is that student counselling be offered at the time of selection itself because it is painful to witness potential scholars and scientists finding themselves as under-achievers. Personal problems were found to be of greater relevance for adjudging the under-and over-achievers. The fact that over-achievers have a personal orientation toward studies could easily be guessed even as the history of under-achieving has a high correlation with future under-achievement.

A good study and very well-produced.

Education and Political Culture in India. Ehsanul Haq. Sterling Publishers Pvt. Ltd., New Delhi, 1981, pp. 176. Price : Rs. 60

THE PRESENT publication is the result of a doctoral dissertation submitted to Jawahar Lal Nehru University in 1979. The study relates to the limits of schooling system and political socializa-

tion. Professors Karl Mannheim and Talcott Parsons rightly point out that the school system merely reflects the total social system of which the former is a mere sub-system. Professor S.C. Dube in his foreword reinforces the existence of social operations and the cultural patterns as they are when he says: "the study shows that the school has an undoubted potential but under the prevailing circumstances the family plays a more significant role than the school". The personal ambitions and the status of the families have a high correlation with the academic performance of the children. It is no wonder if this study brings out the fact "that the differential in political orientations of school children are a consequence of a hierarchical political culture and a hierarchical social structure.

Though the sample was limited the results are not unexpected. We find in all our universities that the students are largely divided into two classes, one the "articulate-moderates" and the other, the "inarticulate-militants". It is this latter class, which perhaps belongs to the first generation learners, which is responsible for all the violence on the university campus. In a structured society like ours we cannot but hope to have politically committed teachers and politically-oriented students. This small minority must also counterface the ones who are quite different on this scale. Whether or not this existence of militancy is beneficial to our society we cannot wish it away. We have in all probability to live with it.

It is a good study but needs replication before we can have an all India picture before us. Be that as it may, Dr. Haq deserves appreciation for his imaginative work.

Structure and Performance of College Education. Rudolf C. Heredia. Somaiya Publications Pvt. Ltd., 172, Mumbai Marathi Granth Sangrahalaya Marg, Dadar, Bombay, 1981, p p. 192. Price : Rs 65

THE PRESENT publication is the edited version of a doctoral dissertation accepted by the Department of Sociology at the University of Chicago in 1979. Dr. Heredia has studied the affiliated colleges of the Bombay University for their structure and organization. Besides the fact that Dr. Heredia is familiar with the university of Bombay he found it convenient to undertake this work because the

Bombay University is "among the oldest and most prestigious in the country". The reason for this study was to find out why the affiliating structure is so basic to the crises in many an Indian university.

It is one study whose methodology should interest the researchers more than the actual findings. The data collection strategies include: (i) records on file, (ii) close-ended questionnaires and (iii) open-ended interviews. The sample consisted of 22 colleges out of 23. In fact the 'sample' was not statistical because the researcher took the 'population' of arts and science colleges as such. He also applied "regression analysis" as a tool of study. The major conclusions are:

1. There exists institutional selectivity on the basis of examination results.
2. "What is required is to relieve the university of the burden of having to establish a standardized 'common currency' in certifications across such vast student populations, a task which in any case it is performing with rapidly decreasing credibility."
3. Bureaucracy is more important than professionalism.
4. Teachers are expected to be scholars and not researchers—a fact which Robbins Committee wanted to be partially modified in the interest of university education.
5. Teachers are not innovative enough.

Clearly a watermark in research in education

R. P. SINGH □

INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH JOURNALS

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Pupils' and Teachers' Perception of the Aims of Education

A Comparative Study

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EDUCATION is a goal-oriented activity. Without well defined objectives to achieve, it is reduced to the status of a rudderless ship drifting along with the waves with no hope of reaching anywhere. Aims are quite reasonably presumed to play a crucial role in determining the syllabi, methods of teaching, pupil-control ideology and classroom organization of the school. Notwithstanding the fact as to which agency determines the aims of education, the teacher is expected to conduct his classes, in keeping with the aims to which the school in which he is employed is committed. In practice, however, a school may or may not come to the standards laid down by the school management. The hiatus between the two may be due to teacher's lack of understanding of the standard and hierarchical order of the aims in context of social needs or their lack of ability to translate them into corresponding classroom behaviours or a willful disregard of them. It would, perhaps, not be far from truth to say that our secondary education has been more a victim of a gross misconception of aims than any other thing. The significance of a clear conceptualization of the goals—both individual and social—on the part of educators can, therefore, be not under-estimated. It is needless to say that aims serve as motivating conditions and steer educational endeavour towards correct direction. Two teachers committed to two different sets of educational aims will deal differently the same school problems. Not only this, the sets of aims will even affect methodology of teaching and their attitude towards the students.

It is also not necessary that different teachers working with different aims of education may be aware of all the aims. Since the aims are so significant in affecting methodology of teaching and attitude towards the students, it is necessary that their perceptions about various aims of education and their relevance in meeting particular or general needs should be properly understood by them.

Interestingly enough, not a few of the headmasters, not to speak of the teachers, go about their work unmindful of their ignorance about the 'why' of education. It is evident from the report of H.M. Inspectors who found out that some of the teachers who were considered to be most successful in practice were least able to formulate their aims clearly and convincingly.¹ The competence of such teachers to deliver the goods can be assumed to enhance a great deal if they have a clear vision of the aims of education and can formulate them in terms of pupil behaviour.

The most important element in the teaching-learning process is the child. If he is not properly conscious of the aims and what they mean to him, he is not likely to be motivated in the teaching-learning process which the teacher provides, in order to attain them. Hence, the teacher should necessarily give due attention to the aims of education as perceived by the students. Moreover, the investigator is of the opinion that if there is agreement between the two regarding the aims of education and what should be done to achieve them, much of the problems of motivation will be solved and learning will become more purposeful and meaningful to the child.

Purpose of the Study

Surprisingly enough, this vital area of education which appears pregnated with numerous possibilities of important findings has not received as much attention of the researchers as it deserves. The present study was conducted with a view to find the perception of the aims of education of teachers and of pupils of secondary schools and colleges. The following specific questions were sought to be answered by this study :

1. What are the aims of education as identified by pupils and teachers of secondary schools ?

¹*Children and their primary school* (Plowden Report)

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2. What is the order of these aims with regard to their importance as perceived by students and teachers ?
3. Do the students and teachers agree in their perception about relative importance of various aims as found through their rank order ?
4. Does any difference exist in the college and school students in perception of relative importance of the aims of education ?
5. Does any difference exist in the perception of students and teachers in aims with respect to their relative importance ?

Sample

The sample of the study consisted of students as well as teachers. The students were boys as well as girls. Similarly, the teachers were men as well as women. The students and teachers belonged to the two schools maintained by the Aligarh Muslim University. The sample was drawn from Classes VI, VIII and X. Some students from the B.A and B.Sc. classes were also included. The distribution of sample is as follows :

TABLE 1
DISTRIBUTION OF SAMPLE BY SCHOOL, CLASS AND SEX

<i>S. No.</i>	<i>Classes</i>	<i>Boys</i>	<i>Girls</i>	<i>Total</i>
1.	VI	51	100	151
2.	VIII	64	77	141
3.	X	57	75	132
4.	B.A.	51	64	115
5.	B.Sc.	50	50	100
Total		273	366	639

TABLE 2
DISTRIBUTION OF SAMPLE OF TEACHERS BY SEX
AND SUBJECTS TAUGHT

<i>Sex</i>	<i>Frequencies</i>	<i>Subject taught</i>	<i>Frequencies</i>
Male	27	Arts	36
Female	44	Science	35
Total	71	Total	71

Procedure

The investigator developed two opinionnaires for the study, one for students and the other for teachers who participated in this investigation. To the students an open-ended questionnaire was personally administered by the researcher in which they were asked to write down any three aims of education that they perceived to be important. The other part of the questionnaire elicited information regarding the biodata of the pupils. The reason for preferring open-ended questionnaire to the close-ended one was that the former allows complete freedom of response to the students and does not prejudice the perception of the students from the perception of the teachers. Thus it was considered to be a better device to assess pupils' true feelings regarding what the aims of education should be.

The data obtained from the pupils was processed in terms of the number of aims mentioned and the frequencies of mention of each aim. It was noted that in all 37 aims were mentioned by the students. These 37 aims were then grouped into eight meaningful categories with the help of six expert teacher-educators. The frequencies of mention of all such aims as were grouped in any one category were again grouped and accepted as frequencies of mention for that category. The data was further analysed to compare various sub-groups through such statistical techniques as rank difference correlation and coefficient of concordance.

The questionnaire was designed to assess their perception regarding the degree of importance of the 8 broad aims that were formulated on the basis of pupils' perception. Their opinions were collected on a four-point scale in respect of each aim, the response categories were, 'very important', 'important', 'less important' and 'least important' with weights of 4, 3, 2 and 1, respectively. The score for each aim was determined on the basis of the frequencies of response earned by it under each of the four categories multiplied by the weights assigned to the categories. For instance, if the intellectual aim was marked very important by 10 teachers, important by 12, less important by 6 and least important by 3 then its score would be $10 \times 4 + 12 \times 3 + 6 \times 2 + 3 \times 1 = 91$. The aims were ranked in order of their importance as perceived by the teachers on the basis of means of these scores which were struck by dividing each score with the number of teachers. It should be noted that the students were asked to enlist the aims of education which they think are important. Hence, all the aims listed in Table 3 should be considered important from the point of view of the students. The hierarchical order imposed upon them by the students and teachers signifies only the difference of emphasis.

TABLE 3

AIMS IDENTIFIED BY THE PUPILS AND THEIR RANK ORDER

S. No.	Educational Aims	Class VI		Class VIII		Class X		VI+VIII+X		Graduation	
		Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1.	Intellectual aim	2	2	2	3	1	1	2	2	1	1
2.	Character and moral development	1	1	1	1	2	2	1	1	2	3
3	Social adjustment	4	3	3	2	4	5	4	3	6	2
4.	Social reconstruction	8	—	6	4	5	4	6	5	4	6
5.	Training for citizenship	6.5	6.5	7	7	7.5	8	7.5	7	7	7
6.	Vocational aim	4	5	3	6	6	6	5	6	5	4.5
7	Prestige in the society	3	4	4	5	2	3	3	4	3	4.5
8.	Spiritual aim	6.5	6.5	7	8	7.5	7	8	8	8	8

TABLE 4

COMPUTATION OF COEFFICIENT OF CONCORDANCE AND ITS SIGNIFICANCE IN ACCORDANCE WITH THE DEGREES OF FREEDOM df_1 AND df_2

Sl. No	Classes	df_1	df_2	W	F
1.	VI	6.33	12.66	.91	20.22
2.	VIII				
3.	X				

TABLE 5

CORRELATION OF RANKS AND THEIR SIGNIFICANCE BETWEEN CLASSES AND BETWEEN MALE AND FEMALE STUDENTS

S. No.	Classes	Rho	S. No.	Sex (Boys and Girls)	Rho	S. No	School and Gra- duation	Rho
1.	VI and VIII	.898**	1.	Class VI	.89**	1.	Boys	.831*
2.	VIII and X	.904**	2.	Class VIII	.65*	2.	Girls	.840**
3	VI and X	.715**	3.	Class X	.95**			
4.	(VI+VIII+X)& (B.A +B.Sc.)	.95**	4.	(VI+VIII+X)&	.93**			
			5	(B A +B.Sc.)	.40			

N=8, Significant at .05 levels

**Significant at .01 levels

Analysis of Data and Results

The analysis of pupils' perception of aims is presented in Table 3. The broad categories of aims, identified by the pupils as important are given in column 1, rest of the table contains ranks of these aims determined on the basis of pupils' responses. It is at once evident from the results that the intellectual aim and the aim of character and moral development are perceived as most important by pupils of all classes. In case of lower classes, i.e. VI and VIII character and moral development is given precedence over intellectual aim and whereas in case of higher class, i.e X and graduation the order is reversed. The next aims placed in the order of importance by pupils relate to social adjustment and prestige of the society. Strangely but interestingly pupils of classes

VI and X assign third rank to prestige in the society and fourth rank to social adjustment whereas pupils of Class X and graduation are found to reverse this order. These aims are followed in the order of rank by social reconstruction and vocational aims. Some classes give fifth rank to the aim of social reconstruction and sixth to the vocational aim and few others alter this order. A similar situation is observed when perception of spiritual and citizenship aims that come next in order of importance is examined. If spiritual aim is accorded the seventh rank by some classes and the eighth rank by others, the citizenship aim is also treated likewise.

For studying the degree of agreement in contrasting groups in regard to assignment of relative importance to various aims, Kendall's coefficient of concordance and coefficient of Pearson's rank difference correlation were computed which are presented in Tables 4 and 5, respectively. The coefficient of concordance which when tested for significance following Maxwell suggestion through 'F' value was found at .05 level. This indicates that there is general agreement among pupils of classes VI, VIII and X in rank-ordering of the aims. A further analysis of the data through computation of Rho's also corroborates this result. However, it is noteworthy that the degree of agreement is stronger in case of adjacent classes than the degree of agreement between classes VI and X.

The comparison between rank-ordering aims by all high school pupils and by college-going pupils also confirms this result. In order to study whether sex influences pupils' perception in regard to relative importance of various aims, rank difference correlations were computed between rankings of boys and girls at high school and college stages. A look into the results as given in Table 5 shows that all the coefficients are significant except the one between boys and girls of graduation. It is further noticed that all of them except the one found between the boys and girls of Class VIII are significant at 01 level. For Class VIII the Rho is found significant at 05 level. These results disclose that sex is not a factor in perception of relative importance of aims during high school stage. But it influences perception during college education.

The answer to the question whether change in perception of relative importance of aims takes place as students go from one level of education to the next is also available from the data presented in Table 5. It would be observed that no significant change occurs in perception as pupils grow from each lower to successive higher class and from school to graduate class as is evident from significant positive coefficients of correlation found in rank-ordering of aims. However, a

critical study of the coefficients would suggest that there is some change though quite negligible in boys' perception. It is noted that at the school level boys and girls are found to agree strongly in their perception of relative importance of various aims ($Rho = .93$) but this agreement between the two sexes is absent at graduation level ($Rho = .40$). Further, it is found that a higher degree of constancy exists in respect of relationship between girls' perception at high school and graduation stages ($Rho = .84$). This phenomenon is less strong in boys ($Rho = .831$). Obviously some changes might have occurred in boys' perception during college education which renders the relationship weaker. When teachers' perceptions were analysed the following results as obtained are given in Table 6.

TABLE 6
RANKS GIVEN TO VARIOUS AIMS BY TEACHERS

S. No.	Educational Aims	Sex		Subject		Total
		Male	Female	Arts	Science	
1.	Intellectual aim	3.5	2	4	3	3
2.	Character and moral development	1	1	1	1	1
3.	Social adjustment	3.5	3.5	2	2	4
4.	Social reconstruction	8	7	8	7	7.5
5.	Training for citizenship	2	3.5	3	4	2
6.	Vocational aim	7	5	5	5	5
7.	Prestige in the society	6	6	6	6	6
8.	Spiritual aim	5	8	7	8	7.5

Ranking of aims by teachers as presented in Table 6 shows that they consider character and moral development and the aim of citizenship training as of utmost importance. These aims precede even intellectual aim. Social adjustment and vocational aims enjoy fourth and fifth ranks followed by prestige in society. Surprisingly spiritual and social reconstruction aims are assigned the last positions in the hierarchical order of aims by the teachers. When perception of men and women teachers and science and art teachers are compared by means of rank difference correlation (Table 7), it is noted that there is considerable degree of agreement between the compared groups. The coefficient of correlation, which are respectively .76 and .95, are found significant at

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.05 and .01 levels Teachers and pupils, however, do not seem to agree in the assignment of ranks to various aims. The size of Rho is .53 which is far below the value required for significance at .05 level. The absence of identity in the views of teachers and pupils regarding which the aim of education should take precedence over which aim is surely distributing and indicative of one of the vital sources of alienation of pupils from the school and classroom activities.

TABLE 7
RANK DIFFERENCE CORRELATION IN BETWEEN AIMS AS
PERCEIVED BY TEACHERS AND PUPILS, ART TEACHERS
AND SCIENCE TEACHERS, MALE TEACHERS
AND FEMALE TEACHERS (N=8)

<i>S. No</i>	<i>Factors</i>	<i>Rho</i>	<i>Level of Significance</i>
1.	Teachers/Pupils	.53	Not significant
2.	Male teachers/female teachers	.76*	Significant at .05 level
3.	Science teachers/art teachers	.95**	Significant at .01 level

Discussion

The main theme of the investigation was to make a study of the relative emphasis given to various aims by contrasting groups. The results show that there is a great degree of similarity in this regard between boys of all classes, between girls of all classes, between high school pupils and college-going pupils, between girls and boys at high school stage, between men and women teachers and between arts and science teachers. However, significant difference was noted between college-going girls and boys which appears quite reasonable in view of the role differentiation of the two sexes of which both boys and girls become sufficiently aware by the time they pass high school. It is, therefore, not surprising that the two groups are found to differ in their perception of the relative meaningfulness or relevance of various aims of education for them.

The study also found quite unexpected difference in perception of teachers and pupils whereas pupils laid greater stress on aims of personal concern, the teachers did so on aims of social concern. With a view to fulfilling individual and social commitments of education, it appears necessary that ways and means are found to strike proper balance between teachers' and pupils' perceptions. □

Students' Problems of Economic and Material Facilities

A Study

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The objectives of this study were to investigate the pattern of student problems pertaining to the economic and material facilities, to compare the problems on the basis of sex and level, faculty-wise and between hostellers-non-hostellers. It was observed that the students of postgraduate classes and undergraduate female students were suffering acutely whereas undergraduate boy students did not show the problems significantly. The comparison on the basis of sex and level indicated that the girl students at undergraduate level as compared to their male counterparts and postgraduate girls viewed the problem comparatively more. The comparison amongst faculties showed significant difference between the faculties of arts-engineering, science-commerce, science-engineering and commerce-engineering at undergraduate level. It was further observed that engineering students compared to arts students, commerce group compared to science group, engineering group compared to science group, and commerce group compared to engineering group were found suffering more frequently than their counterparts. The statistics further pointed out that science, commerce, agriculture and engineering students were more bothered as compared to arts students. Agriculture students were bothered more than commerce and science students.

THE ACADEMIC world in India is facing a rough weather due to a good number of reasons. The result is that almost

every university in India is suffering mainly because of different and difficult types of problems being faced by the students. Whatever the reasons such as politicization, rowdism, corruption, favouritism, nepotism, academic degradation, or backdoor entry of politically motivated teachers, the fact remains that there is hardly any effort to correctly and sympathetically understand the problems of the youth which they are facing them in the areas such as economic and material facilities and who are certain about their future due to different types of psychological, social and cultural reasons. It is a bare fact that until and unless the problems of the youth are properly understood, nothing concrete can be done to help them for better adjustment in our social set-up. The research workers become interested in the problems of economic and material facilities of the students as there is a pressing need to understand such problems of the students in the correct perspective. In the context of poor diet, malnutrition, inadequate furniture and books, the problem is of greater significance for the hostel students. This problem becomes of still greater significance in the light of higher costs of living and poor economic conditions of parents.

It has been proved by the case studies carried out at the Institute of Psychological Research and Service, Patna University, that the problems of university students vary considerably according to the conditions and situations of the individuals concerned. The researches have shown a consolidated and compiled list of the problems they frequently face and which need the assistance of counsellors.

Sinha and Dash (1959) studied motivational factors underlying occupational choice. From a checklist of 20 items, 200 male and 100 female college students majoring the arts indicated that their high ranking reasons for choosing particular vocation were 'money'. In another study conducted in October 1969, students indicated the problem of poverty as one of their major problems. Yadagiri (1962) conducted a study of the students of Osmania University. He indicated that indiscipline was a symptom of maladjustment in areas of socio-economic factors.

Similarly, Rao (1970) summarized the work of D'souza and said that many of the Indian universities and colleges have failed to create or sustain an academic climate favourable to intellectual enquiry and debate. The question of academic freedom has been discussed in the socio-economic context and professional security.

Brooks, William and Lawrence (1974) studied college drop-outs. The responses of the 113 students who returned the questionnaire noted the financial problems as one of its main causes. Shipstone (1972)

discussed the current problem of educating the Indian adolescent and emphasized the importance of the home environment, vocational guidance and student welfare services in helping them to adjust to the demands of personal and social maturity with poise and confidence. Badami and Badami (1972) studied family adjustment in relation to school achievement, sex and socio-economic status. They found that the students belonging to high and low socio-economic status were comparatively better adjusted in their families than the students of intermediate socio-economic status. Vidyarthi (1973) conducted a study based on 1970-71 student unrest in Chotanagpur, which covers the territory of Ranchi University. In response to the question as to what are the problems students facing today, a number of them were listed such as economic instability, housing shortage, lack of proper guidance, unemployment and high tuition fees.

Method and Procedure

For the present study a stratified random sample of 1,500 students was drawn from the Banaras Hindu University and its affiliated colleges, covering the different faculties of arts, science, commerce, agriculture and engineering. The student problems inventory, constructed by Badam (December 1965) was used as a tool for the present investigation. The Hindi version of the inventory, translated by researchers was used for the purpose. The inventory was self-administered. It is just a record of the problems which trouble the students at the moment. There is no right or wrong answer. An individual's score is the number of statements one marks. Scoring was done by counting the number of problems checked by an individual student at the marked and major level.

All the inventories were first scored and then arranged by sex and level of education, i.e. undergraduate girls (UGG), undergraduate boys (UGB), postgraduate girls (PGG) and postgraduate boys (PGB), numbering 33, 724, 72 and 371, respectively. Statistical treatment was given to the data so as to observe the general pattern of problems and the difference among the problems on the basis of sex and level. The inventories were again arranged facultywise to see the difference among the problems from faculty to faculty. A sample of 150 students was selected through random technique to study the difference of problems between hostellers and non-hostellers.

STUDENTS' PROBLEMS OF ECONOMIC AND MATERIAL FACILITIES

Analysis

The percentages and t-ratios in Table 1 regarding the problem of economic and material facilities (test attached in the Appendix) showed that the number of students suffering from the problem of not having enough clothes was significant from amongst PGG and PGB both at .01 level of confidence. The problem of not having steady income was meant for only postgraduates and was found significant from amongst PGG at .01 level and PGB at .05 level of confidence. The problem that the mothers have to work was meant only for UG students. It was found significant from amongst PGG at .01 level and PGB at .05 level of confidence.

The number of students suffering from the problem of shortage of money in the family was found significant from amongst UGG, PGB at .05 level and PGG at .01 level of confidence. The problem concerning the need of work to help the family was found significant from amongst UGG, PGB at .05 level and PGG at .01 level of confidence. The problem of not having a radio-set at home and not having enough space in the house was found significant from amongst PGG at .01 level and PGB at .05 level of confidence. The problem of not having the house in good locality was significant only with PGG at .01 level of confidence. The problem of not having enough space for study at home and having money for entertainments was found significant from amongst PGG at .01 level and PGB at confidence. The problem of not having enough money was noticed by UGG at .05 level and PGG and PGB at .01 level of confidence. The problem of inability of purchasing educational necessities was found significant from amongst PGG at .01 level and PGB at .05 level of confidence. The problem of extravagance and desire of earning enough money was found significant from amongst UGG and PGB at .05 level and PGG at .05 level of confidence. However, other groups of students did not indicate other problems of the tool at statistically significant level. None of these problems existed with significant number of students in any of the groups as major problem at any level of confidence.

Comparison of Medians on the Basis of Sex and Level

It was noticed from Table 2 that statistically significant differences existed between the groups when the undergraduate girl and boy students and undergraduate and postgraduate girls were compared, at .01 level of confidence. However, the comparison between postgraduate girls and

TABLE 1

ECONOMIC AND MATERIAL FACILITIES

Item No.	UNDERGRADUATE GIRLS				UNDERGRADUATE BOYS					
	Marked	Major	Percentage		Marked	Major	Percentage			
			Marked	Major			Marked	Major		
94	39	—	11 711	—	145	2	20.027	.276	1 487	195
95	31	—	9.309	—	105	13	14 502	1.795	1.166	.492
—	—	—	—	—	—	—	—	—	—	—
96	41	—	12.312	—	120	25	16.574	3.453	1 397	.667
97	56	2	16.816	.600	103	22	14.226	3 038	1.298	.636
78	64	—	19.219	—	115	8	15.883	1.104	1.357	.117
99	32	—	19 609	—	103	7	14.226	.966	1 298	.363
100	40	—	12.012	—	73	3	10.082	.414	1.119	.238
101	31	1	9.309	.300	90	14	12 430	1.933	1.226	.511
102	36	—	10.810	—	75	10	10.459	1.381	1 132	.417
103	45	—	13 512	—	118	26	16 298	3.591	1 389	.689
104	73	1	21.921	.300	182	11	25.138	1 519	1 612	.418
105	30	—	9 009	—	140	12	19.337	1.657	1.467	.474
106	61	1	19 318	.300	125	22	17.265	3.038	1 413	.636
107	88	1	26 426	.300	214	8	29.558	1 104	1.699	1.174
108	22	2	6 606	.600	18	18	11.049	2 486	1.164	.649
109	19	—	5.705	—	96	9	13.259	1 243	1.265	.412

TABLE 1 (contd.)

Item No.	POSTGRADUATE GIRLS						POSTGRADUATE BOYS					
	Marked		Major				Marked		Major			
	Percentage		Significance of Percentage				Percentage		Significance of Percentage			
	Marked	Major	Marked	Major	Marked	Major	Marked	Major	Marked	Major	Marked	Major
72	17	1	23.611	1.388	5.047**	1.387	108	1	29.110	.269	2.606**	.268
73	6	—	8.333	—	3.333**	—	50	—	18.477	—	1.769	—
74	6	—	8.333	—	3.333**	—	64	2	17.250	.539	1.961**	.380
75	12	—	16.666	—	4.391**	—	74	—	19.946	—	2.080*	—
76	24	1	33.333	1.388	5.555**	1.378	139	4	37.466	1.078	2.841**	.536
77	18	1	25	1.388	5.108**	1.378	122	5	32.884	1.347	2.438*	.598
78	12	—	16.666	—	4.391**	—	81	—	21.832	—	2.147*	—
79	13	1	18.055	1.388	4.352**	1.378	66	1	17.789	.269	1.981*	.268
80	6	—	8.333	—	3.333**	—	43	1	11.590	.269	1.662	.268
81	18	2	25	2.777	5.108**	1.936	97	2	26.145	.539	2.283*	.380
82	18	—	25	—	5.108**	—	102	—	27.423	—	2.216*	—
83	25	—	3.472	—	2.159*	—	135	6	36.388	1.617	2.497*	.654
84	11	1	15.277	1.388	4.239**	1.378	72	2	19.407	.539	2.053*	.380
85	18	—	25	—	5.108**	—	100	3	26.954	.808	2.303*	.464
86	20	1	27.777	1.388	5.285**	1.378	121	4	32.614	1.078	2.433*	.536
87	8	—	11.111	—	3.703**	—	39	2	10.512	.539	1.592	.380
—	—	—	—	—	—	—	—	—	—	—	—	—

**Significant at 1% level of confidence

*Significant at 5% level of confidence

boys, undergraduate and postgraduate male students did not show any statistically significant difference between them

TABLE 2
COMPARISON OF MEDIANS ON THE BASIS OF SEX AND LEVEL

	<i>Median₁</i>	<i>Median₂</i>	<i>CR Median</i>	<i>Group of Higher Medians</i>
UGG vs. UGB	.20	.18	3.84**	UGG
PGG vs. PGB	.35	.26	0.41	PGG
UGG vs. PGG	.20	.35	4.45**	PGG
UGB vs. PGB	.18	.26	1.93	PGB

**Significant at 1% level of confidence

Comparison of the Problems of Different Faculties

While comparing the problems among different faculties at undergraduate level in Table 3(A), it was observed that statistically significant difference existed between arts and engineering students at .05 level of confidence. The statistically significant difference was found between the group of science and commerce students at .05 level of confidence. The comparison of science and engineering group indicated significance at .01 level of confidence. The commerce and engineering students

TABLE 3 (A)
SIGNIFICANT DIFFERENCE AMONG THE FACULTIES
AT UNDERGRADUATE LEVEL

	<i>Mdn₁</i>	<i>Mdn₂</i>	<i>CR Mdn</i>	<i>Group of Higher Mdn.</i>
Arts-Science	.11	.16	0.05	Mdn ₁
Arts-Commerce	.11	.50	1.36	-do-
Arts-Engineering	.11	.32	2.54*	-do-
Arts-Agriculture	.11	.59	1.50	-do-
Science-Commerce	.16	.50	2.05*	-do-
Science-Engineering	.16	.32	3.51**	-do-
Commerce-Agriculture	.50	.59	0.06	-do-
Commerce-Engineering	.50	.32	2.27*	-do-
Agriculture-Engineering	.59	.32	0.31	-do-

*Significant at 5% level of confidence

**Significant at 1% level of confidence

STUDENTS' PROBLEMS OF ECONOMIC AND MATERIAL FACILITIES

showed statistically significant difference at .05 level of confidence. However, no statistically significant difference existed between the faculties of arts-science, arts-commerce, arts-agriculture, science-agriculture commerce-agriculture and agriculture-engineering.

TABLE 3 (B)

SIGNIFICANT DIFFERENCE AMONG THE FACULTIES AT POSTGRADUATE LEVEL

	<i>Mdn.₁</i>	<i>Mdn.₂</i>	<i>CR Mdn.</i>	<i>Group of Higher Medians</i>
Arts-Science	.22	.34	3.15**	Mdn. ₁
Arts-Commerce	.22	.43	5.33**	-do-
Arts-Agriculture	.22	.44	4.71**	-do-
Arts-Engineering	.22	.56	4.10**	-do-
Science-Commerce	.87	.43	1.34	Mdn. ₁
Science-Agriculture	.87	.56	1.16*	-do-
Science-Engineering	.87	.56	2.44*	-do-
Commerce-Agriculture	.43	.44	2.44*	-do-
Commerce-Engineering	.43	.56	.14	-do-
Agriculture-Engineering	.44	.56	.21	-do-

**Significant at 1% level of confidence

*Significant at 5% level of confidence

However, at postgraduate level the differences between arts-science, arts-commerce, arts-agriculture and arts-engineering groups were found statistically significant at .01 level of confidence respectively. Commerce and agriculture students showed significant difference among their problems at .05 level of confidence.

Comparison of the Problems of Hostellers and Non-hostellers

The data depicted in Table 4 viewed no statistically significant difference between the two groups. However, it was noticed through medians that problems were more frequent with non-hostellers.

TABLE 4
COMPARISON OF HOSTELLERS AND NON-HOSTELLERS

<i>Hosteller Median</i>	<i>Non-hosteller Median</i>	<i>CR Median</i>	<i>Group of Higher Median</i>
2.250	6.80	.863	Non-hosteller

Discussion

The statistics depicted that the problem of economic and material facilities indicated that none of the problems was expressed by statistically significant number of undergraduate male students. However, the undergraduate female students suffered from the problems of shortage of money in the family, need of work to help the family, not having enough money, extravagance and want to earn enough money at statistically significant level of confidence.

The postgraduate female students showed suffering from the problems of not having enough clothes, not knowing about different types of entertainments, not having steady income, mothers have to work for maintaining family, family runs short of money, need of work to help the family, not having a radio-set at home, not having enough space in the home, not having the house in a good locality, not having enough space for study at home, not having enough money for entertainment, not having enough money, inability to purchase educational necessities, too much extravagance, want to earn enough money and not getting proper food.

Amongst the postgraduate male students the following problems were found to be statistically significant : not having enough clothes, not having steady income, mothers have to work for maintaining family, family runs short of money, need of work to help the family, not having a radio-set at home, not having enough space in the house, not having enough space for study at home, not having money for entertainment, not having enough money, inability to purchase educational necessities, too much extravagance and wanted to earn enough money.

So far as the finding of the study with regard to postgraduate female students regarding the problem not having enough space at home is concerned, it confirmed the findings of Elizabeth (1966) who had concluded that not having space at home was one of the main reasons of drop-outs.

The postgraduate group of students was troubled with the problems of not having enough clothes, unsteady income, mother had to work for maintaining family, family runs short of money, need of work to help the family, not having enough space for study at home, not having money for entertainment and not having enough money.

The results of the study with regard to PG students that the mother had to work partially confirmed the findings of Hansson, Chernovetz and Jones (1977) that there was significant relationship between material employment and sex-type problems.

The comparison of undergraduate girls with undergraduate boys indicated that significant differences existed between the two groups. The higher median of girl students as compared to undergraduate boy students revealed that the problems were more pressing with undergraduate girls. The results of the study rejected partially the findings of Badami and Badami (1972) that the male students were significantly more poorly adjusted than the female students. Beit-Hallahmi, Benjamin (1974) also confirmed the finding of the study by observing that females were more concerned than males with all the areas. The comparison of undergraduate and postgraduate girls indicated statistically significant difference in their problems. The higher median of postgraduate girls visualized that they were troubled more with the problems. This, to some extent, may be attributed to the frustration which these girls might be experiencing by not finding for them suitable market both in the world of work and marriage.

The comparison of arts and engineering groups showed significant difference and the higher median of engineering group students as compared to arts groups showed that their problems were more pressing with the students of engineering faculty. The results of the study partially rejected the findings of Sharma (1963) that there is no difference between the problems disturbing the science and non-science students. It also partially rejected the findings of Sarkar (1964), who in his survey pointed out that the students of professional colleges showed much less dissatisfaction with the socio-economic conditions than the students of non-professional colleges.

The difference among the problems of science and commerce students was also found significant. The higher median of commerce group depicted that commerce group suffered more acutely as compared to science students. The comparison between the faculties of science and engineering showed statistical significance. The higher median indicated that the problems were more pressing with engineering students.

When the faculties of commerce and engineering were compared,

significant difference was noticed. The higher median pointed out that commerce students are suffering acutely as compared to engineering students.

The comparison of arts and science students viewed that statistically significant difference existed between the group. The higher median indicated that the problems were more pressing with science students. While comparing arts and commerce students, it was observed that significant difference existed amongst them. The higher median of commerce students indicated that they are frequently bothered with the problems in comparison to arts students. The data concerning the comparison of arts and agriculture students showed significant differences with the problems between the faculties. The higher median pointed out that the problems were more acute with agriculture students. Similarly, significant difference existed between the faculties of arts and engineering groups. The higher median showed that the problems were more troublesome with the engineering group. The results of the study partially rejected the findings of the study of Cattell (1962) and his co-workers. They had found that arts students are more conservative in temperament and concluded that students of engineering and commerce group were progressing towards radicalism and tended to be more inclined to experiment with problems' solution and less inclined to moralize.

The comparison of commerce and agriculture faculty was found at significant level. The higher median of agriculture students showed that this group was more frequently bothered in comparison.

Conclusion

The problem of economic and material facilities showed significant differences amongst the groups. The undergraduate boys did not report any problems regarding economic and material facilities at either marked or major level. The problems of shortage of money in the family, need of work to supplement family income, inadequate money, extravagance and desire to earn enough money were experienced by undergraduate girl students. The postgraduate girls revealed the problems of clothes, entertainment, unsteady income, mother's compulsion to work for maintaining the family, family running short of money, desire of work to help the family, not having enough space in the house, not having the house in a good locality, inadequate space for study at home, not having enough money for entertainment, not having enough money, inability to purchase educational necessities, extravagance, desire to earn enough money and not

getting proper food. The postgraduate boys revealed the problem, i.e. not having enough clothes, unsteady income, mother's compulsion to work for maintaining family, family running short of money, need to work to help the family, not having a radio-set at home, not having enough space in the house, not having enough space for study at home, inadequate money for entertainment, not having enough money, inability to purchase educational necessities, extravagance, desire to earn enough money. When the comparison was made amongst the groups on the basis of sex and level, it was observed that the problems were more pressing with undergraduate girl students as compared to undergraduate boy students. The postgraduate girls revealed that they are more frequently bothered with the problem than undergraduate girls and their postgraduate male counterparts. The postgraduate boys faced the problem more frequently than undergraduate boys.

While comparing the faculties at undergraduate level the data revealed that statistically significant differences were found among the groups of arts-engineering, science-commerce, science-engineering and commerce-engineering. The data indicated that engineering group compared to arts and science group; commerce students more than science and engineering groups suffered frequently. No statistically significant difference existed among the groups of arts-science, arts-commerce, arts-agriculture, science-agriculture, commerce-agriculture, agriculture-engineering. When the comparison was made amongst inter-faculties at postgraduate level it was noticed that arts-science, arts-commerce, arts-agriculture, arts-engineering groups depicted significant differences. It was further observed that science, commerce, agriculture and engineering group as compared to arts students and agriculture students as compared to commerce students were more frequently bothered with the problems. No statistically significant difference existed amongst the faculties of science-commerce, science-agriculture, science-engineering, commerce-engineering and agriculture-engineering.

However, no significant difference was visualized when the students living at home and at boarding houses were compared but it was noticed that problems were more troublesome with non-hostellers.

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Appendix

LIST OF STATEMENTS OF ECONOMIC AND MATERIAL FACILITIES, i.e. PART III OF STUDENT PROBLEM INVENTORY BY DR. H.D. BADAMI

94	I do not have enough clothes	72
95	I do not know about different types of entertainment	73
—	I do not have steady income	74
96	Mother has to work for maintaining family	75
97	Family runs short of money	76
98	I need work to help the family	77
99	I do not have a radio-set at home	78
100	I do not have enough space in the house	79
101	I do not have the house in a good locality	80
102	I do not have enough space for study at home	81
103	I do not have money for entertainment	82
104	I do not have enough money	83
105	I am unable to purchase educational necessities	84
106	I am too extravagant	85
107	I want to earn enough money	86
108	I do not get proper food	87
109	I experienced difficulty in fulfilling my basic needs of life	—

□

A Child with Learning Difficulties

Importance of Play in Remedial Work

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In this case report a child with learning difficulty is described. The background of the case, understanding and the kind of help provided to the child is illustrated.

LEARNING DIFFICULTIES of school-going children pose great problems to teachers, parents and children. There are various reasons for learning difficulties. In this report the focus is on learning difficulties due to emotional factors, and on the type of help provided for it.

Let us name this child as Raju. He was slow and had lost interest in writing. He was attending an English-medium school and his mother tongue was Gujarati. At his age 6 (Class II) he was referred to the clinic for help by the school authorities. The mother was very anxious and worried as he was not able to copy from the blackboard. 'What would happen to my son?' was the mother's anxiety. At the time of dictation in the class he used to get confused about how to write. If pressurized he might write couple of sentences and then stop. The mother also reported that he was slow in his daily activities (brushing, getting up from sleep, eating) too. He needed mother at the time of meals otherwise he used to remain hungry. Why was he slow in writing? Did he have an ability to cope with the academic demands of Class II? If he had enough intelligence what were the reasons for this slowness? Naturally these questions came to one's mind.

A psychologist decided to spend some time with Raju to understand his difficulties. The meeting was held in playroom, full of toys and games, as children of his age like to play rather than talk about the problems they are facing. He decided to draw a house with chimney from which smoke was going up. He said that the food was being cooked. He also talked about the importance of vitamins and nutritive food. By doing this he was communicating about his concern over food. While talking he was told by the psychologist that he had an ability to draw a house. In the drawing that followed, the house was the recurring theme. He was also concerned over parents' demand for strict daily routine and lack of freedom for movement. On tests of intelligence he scored an average IQ but there were lot of indications that he could have scored higher if he was emotionally free enough to respond to the test. He was confused and probably this hampered his learning process.

Raju's mother reported in a separate interview, that he was admitted to the school at his age 3 yrs. The adjustment to the school was difficult. He used to cry a lot. The slowness in writing was noticed within 6 months of admission. The teacher also complained about the same, which made the mother more and more anxious. She started beating him. Poor Raju got confused as to why the mother was beating him. He was too young to associate the slowness in writing and beating. Gradually a pattern was established. Raju is slow that is why he was beaten and because he was beaten he was slow. Disappointed mother said : "We are doing everything possible but there is no satisfactory result". Was Raju getting attention from his mother by being slow? If he was fast in writing would the mother pay him this much attention and worry about him?

Remedial Work

It was decided to call him once a week to the clinic and a worker* decided to meet him. He started working on clay and drawing. He talked a lot while working. He disliked his school and also the teacher who used to scold him without reasons. He felt that he liked English language rather than Gujarati. (He was reported to be doing poorly in English.) He indicated that he knew the English language better than any other child in his class. They even could not speak a word, he felt.

*A psychologist or a social worker working with the boy. It could be a teacher also.

The worker listened to him without any doubt and with interest. The worker's non-critical attitude towards him helped Raju to gradually accept that he was not doing too well in English language. This resulted in sharing his fears about going on stage for drama and his inability to speak loudly in class while answering the question. With this it was obvious that he was then ready to accept his difficulties without fears.

It was also the time when the worker who was meeting him left and he started having tussle right from the beginning with the second worker. He became demanding and wanted the things which the worker was not able to provide. He refused to read or write. This resulted in disappointment in the worker. Finally they settled on telling and listening stories. Followed by this Raju started withdrawing and speaking less and less. He was helped to talk about his worries and it was evident that his mother had gone out of town leaving him alone at home for the first time. This made him angry and he was in turn getting angry with the worker at the clinic.

On re-tests of intelligence he scored an above average IQ but he was slightly backward on achievement tests. This indicated that now with the clinic's help he was able to make use of his intellectual ability more comfortably but the academic area still remained emotionally loaded. This is the time when I was introduced to him as I had decided to work with him. I thought he was ready to sit down, and concentrate on one activity. So I planned to see him in my office. He was not ready for this and felt that the room was too small to move around freely. He remembered the playroom where he used to play with a ball. I conveyed to him that I had only that much space and some material for him to spend one hour a week with me. If he wished he could make good use of the material and the time available. He selected to play 'ludo'. I was happy that he had selected something which requires interaction among two persons, boosing in the game was very difficult for him. He would do anything and everything to win. He changed rules and had different rules for me and for himself, to suit his convenience. I played honestly with him. I told him that it was difficult for him to accept defeat in the game. He turned deaf ears to this. Gradually he saw that I did not mind his changing rules, so he started following the rules. We played other games following the rules and he was able to accept the defeat with little more comfort. He wanted new games when we finished with what we had. I told him that I had only that many games and other material if he wanted he could make use of the other material. That was the first time when he looked at story books, and hesitantly asked

me to read a story for him. I accepted to read the story with pleasure. He enjoyed the story. He suggested "you read and then ask question, I will answer, you give marks." His answers to my questions after I read the story, were good and with understanding for which I praised him. This helped him to take more responsibility. "You read one page and I will read another page. But if I find it difficult you have to help me". When he read he attempted to imitate me in reading. We read all story books available in my office.

This was followed by focusing his attention on maths. He said, "I know maths, give me some sums". He decided marks for each step for sum by judging its difficulty value. He could do sums correctly and a few were wrong due to his hasty approach. This we discussed while giving marks for each sum. He understood where he was making mistakes in hurry. He could accept whatever I said with seriousness. He then started drawing the figure of sparrows in different actions—sitting, flying, feeding the younger one, etc. I told him about his good mastery over drawing and deep observation of sparrows in different actions.

Reading, arithmetic, and drawing of sparrows followed by writing which was his referral problem. He chose to write whatever he saw on the way from his home to clinic. Both English and Gujarati languages were used. He showed how to draw a face by writing 'No. 5', I responded by showing how to draw a face by writing 'No. 10', and how to draw a mouse by writing 'M'. He learned this with keen interest. We were also competing for showing playing cards magic. In the process we discovered a game of writing name of films and actors in a given time limit.

With trial and error we arrived at a game where we prepared chits of Gujarati and English alphabets. One has to pick up a chit, whatever alphabet you get, you have to write name of the city, actor, film, fruits, etc starting from that alphabet. Whatsoever complete would count 50 and in that time other person has to complete his task. This way we were competing for writing in speed. This was the time when he had completed the treatment of two years on once a week basis and was ready to stop. The mother reported that he was then interested in doing home-work and was able to take tuition from two teachers at home without any resistance and with satisfactory results.

Discussion

It is obvious from the case report that play is an important aspect

of child's learning. Formulation by Irene Caspani would be quite pertinent here.

You have to be able to play before you can be able to learn, i.e. to play in Winnicott's sense, where the other person enters into your play rather than demands things from you, you have to have a good enough play as you have to have good enough mothering. In a way it is part of mothering.

A young child learns through play. To begin with the infant plays with his body and gradually learns about his body parts. When he grows older and starts walking he explores the environment. With this the use of speech becomes important. A child plays with toys—sometimes alone and sometimes with other child/children—learn to share toys and enjoys. The next step is to play games which has rules and develop an ability to follow rules and accept defeat. This hopefully prepares the child for academic learning. Learning also has rules. One has to sit down with children of one's age, and look and listen to the teacher, understand whatever he is saying or writing, retain and reproduce whenever it is required. This process requires the child to interact with children and teacher. In this way study becomes a part of a continuum, i.e. play—games—study.

Raju as described in this case report was not able to make proper use of school facilities in spite of his good intelligence. In the process he had developed a feeling of inferiority and was unable to compete with other children. To begin with he was unable to accept his difficulties in learning. He thought he was doing better than other children of his class. The non-critical attitude of worker gradually helped him to accept his difficulties without fear of criticism or scolding. Emphasizing the positive point thus making it non-threatening during playing games with him (drawing, ludo, cards, talking) worked as reassurance for him and he started taking more challenges for reading and writing. What he experienced in the work with him was the positive relationship with the worker which was different and comfortable from what he had experienced at home and school, with teacher and parents. The work helped him to discover himself as a competent, intelligent boy who can compete with others without fear of defeat. This in turn resulted in comfort in learning. □

*Irene Caspani. *Commemorative symposium*, Tavistock Clinic, London, 23, 1977

Developing a Modernity Attitude Scale

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ATTITUDE as a research construct has attracted the attention of scholars in various fields of social science and is being extensively used in social investigations all over the world. In one of the most influential works, *The Polish Peasant in Europe and America* Thomas and Znaniecki (1927) gave a new accent to the scientific study of attitudes. The study emphasized the need and significance of the empirical analysis of the nature of attitudes in order to gain insight into the social life of people. This made attitude one of the most distinctive and indispensable concepts in social research. Thurstone (1946) defines an attitude as degree of positive or negative affect associated with some psychological object. By a psychological object, Thurstone means any symbol, phrase, slogan, person, institution, ideal or idea toward which people can differ with respect to positive or negative affect.

Recent research in modernization has revealed the significance of the study of attitude pertaining to certain significant institutional realms to ascertain the modernity at the individual level (Doob 1960, Dube 1967, Inkeles and Smith 1974, Kahl 1968, Kunkel 1965, Rogers, 1969, Stephenson 1968). Scientific study of attitudinal modernity assumes special significance in the contemporary world as the attitudes ascribed to modern man are essential pre-conditions for socio-economic development and progress of any nation.

Need for Developing the Scale

The growing importance in the quantification and systematization of attitudinal data has geared the development of scales on such significant issues as co-education, capital punishment, women's rights, family planning, minority group, labour unions, communism, UNO, etc. Of late, attitude scales on political, social and religious institutions, science, scientists and problem-solving, literacy, education and teaching have become highly popular. Despite the availability of scales on several significant issues, there is a dearth of standardized attitude scales in India especially to obtain the climate of opinion on social aspects like marriage, family, religion, etc. Hence, it was thought highly relevant to formulate a standardized and dependable device for measuring social attitudes especially of people in rural and backward areas in India.

Terminology

For the scale construction the 'attitude' is taken as an enduring system of positive and negative evaluations, emotional feelings, pro and con action tendencies with respect to a social object. The social attitude, therefore, has been operationally defined as generalized attitude toward certain social objects and being measured in terms of the favourableness and unfavourableness estimated from the scores obtained by the subjects on an attitude scale. The universe of 'social attitude' for the present scale contained five major social realms: (i) religion, (ii) marriage, (iii) family, (iv) status of women in society, and (v) education.

The tradition-modernity continuum is taken to assess the social attitude of subjects. Modernity connotes a certain type of culture whose quality is determined by rationality, scientific outlook, liberal spirit, equality, democratic orientation, secular ethics, and emphasis on the sense of personal efficacy, openness to experience and innovation and readiness for change. The extent to which the above ideologies are reflected in the social attitudes of subjects is taken as a measure of attitudinal modernity.

Technique Adopted

While controversy exists over the relative merits of different scale models in attitude scale construction, the procedure of 'summated

ratings' described by Likert (1932) is probably the most influential and frequently employed method. This is due mainly to the relative simplicity of the technique involved and the comparative ease in administering scoring the Likert-type scales. More significantly, studies which have compared the Likert procedure with alternatives as Guttman scales, Thurstone scales, the semantic differential scales have consistently shown that attitude measures developed by the Likert procedure is more reliable and functions more effective as predictor of behaviour (Edwards and Kenney 1946, Green 1954, Edwards 1957, Weaver 1962, Poppleton and Pilkington 1964, Tittle and Hill 1967, Kerlinger 1973, Thomas and Williams 1977). For developing the present 'scale' thus the standard procedures and statistical techniques suggested by Edwards (1957) for the summated method were used.

Description of the Scale

The Modernity Attitude Scale (MAS) is designed as a five-point Likert-type forcing scale consisting of five sub-scales assessing the social attitudes of the subjects. The MAS is self-administering if the examinee fully understands directions. It can be administered individually or in a group setting. Brief description of the scale areas together with the specific social issues under them is given below.

1. *Attitude towards Religion*

The institution of religion has been of crucial importance in the social life of people in India. The religious notions touch upon almost every aspect of life and their influence can hardly be over-emphasized. From birth till death, irrespective of sects, people participate in countless ceremonies. Though it is believed that with the advancement of science and technology in India, the institution of religion will be affected adversely, it still retains much of its past significance and vigour. For the purpose of probing into the sacred-secular dimension of religion, reactions to such social issues, as religious faith, belief in God, worship, religious rituals, religious festivals, religious ceremonies connected with birth, death, marriage and affiliation to religious institutions were studied. Respondents' agreement or disagreement to statements regarding the above issues were taken as extent of modernization achieved by them in the realm of religion.

2. *Attitude towards Marriage*

Marriage is regarded as one of the most important social institutions leading to the formation of the primary social group, as family. The marriage customs and practices in India, as elsewhere, are considered essential components of social life of people. One important feature of the institution of marriage in most parts of India is the prevalence of dowry system. Another important characteristic with regard to this institution is the marital age. Previously the practice of child marriage was very popular in different communities in India. Peculiar forms of marriage such as the 'exchange marriage' and 'cross-cousin marriage' were also prevalent. Caste and religious endogamy strictly restricted the inter-caste/inter-religious marriage. However, most of these characteristics are undergoing changes. The 'scale' included statements on attitude towards issues such as traditional and modern forms of marriage, dowry, inter-caste/inter-religious marriage, freedom of choice of mate, widow-marriage, divorce and age at marriage.

3. *Attitude towards Family*

Study of the systems of family and family organization is absolutely essential to understand the cultural phenomena of Indian social life. In rural India the joint family system is still in vogue and its existence can be traced back to time immemorial. However, a switch-over to the small nuclear family is the contemporary trend. Status of family has all along been considered as one of the prime prestiges. Another aspect is the lack of freedom among the members of households as a result of their submission to the head of the household. Respondents' reactions towards statements concerning planned family, family planning, sentiments and attachments toward one's family, authoritarian-democratic atmosphere of family, etc are taken separately in the scale.

4. *Attitude towards Status of Women in Society*

Traditionally, women had a very low status in India. They did not have any share in family property. Female education was almost absent in certain communities. Women were hardly consulted while taking any important decision within the family. They were not allowed to take up employment outside their houses. All these practices gave women a very low status in society. However, in recent years, social reform movements, legislation and the increased educational opportuni-

ties have gone a long way in emancipating women from their traditional status. Employment of women, education of girls, equal share in family property and equal right in family affairs, observance of purdah system, political and social freedom, etc are considered while framing statements regarding this aspect of study.

5. Attitude towards Education

Education was restricted to certain communities in traditional Indian society. Equal opportunity of education is a rather recent development. Female education was a taboo and the intermixing of girls and boys in educational institutions was not quite appreciated. Accordingly, the statements in the 'scale' included expression of attitudes to such social issues as women's education, co-education, sex education, spread of literacy, equality of educational opportunity, teacher-pupil relationship and traditional system of education.

Procedure for Developing the Scale

The Item-pool

The initial pool of items gathered with the help of specialists and by referring to the standard literature on the subject were edited and classified under the five major areas described above. The precautions based on the informal criteria suggested by Wang (1932), Bird (1940), Edwards and Kilpatrick (1948), and Thurstone and Chave (1929) were taken while editing the statements.

The initial draft of 250 items underwent revisions many a time. In order to ascertain the internal consistency of the items and to eventually improve the scale, the draft was sent to five judges for their comments. The five areas included in the scale were explained together with the modernity-traditional dimension. Upon their suggestion, some statements were rejected while others were improved upon. Finally, the list contained 200 statements, 40 each in the five areas already mentioned, divided equally into positive and negative items.

The Try-out

The five-point forcing scale with 200 statements was administered on 400 adults residing in two backward villages in Malabar, Kerala under

DEVELOPING A MODERNITY ATTITUDE SCALE

standard conditions. The subjects were chosen randomly from 400 households. The procedure for marking the responses was clearly explained by giving instructions to the respondents. The 400 test booklets thus obtained were scrutinized. Some booklets (17 in number) were seen to be incomplete in some respect or the other and as such were discarded for further analysis. Dropping a few at random (13), the remaining booklets were reduced to 370 for facilitating computations for item analysis.

Scoring Scheme

For scoring the 'scale' two arbitrary scoring schemes can be followed. The weightage assigned for each response category on the positive (favourable) and negative (unfavourable) items on the two schemes are shown in Table 1.

TABLE 1
SCORING SCHEME FOR MODERNITY ATTITUDE SCALE
AND THE FIVE SUB-SCALES

Item	System A					System B				
	SA	A	U	D	SD	SA	A	U	D	SD
Positive	5	4	3	2	1	+2	+1	0	-1	-2
Negative	1	2	3	4	5	-2	-1	0	+1	+2

A total attitude score for each subject taking the test can be obtained by summing the value of each item checked by him. Thus, the increase in score would indicate more progressive social attitudes and a higher degree of modernity.

The Item Analysis

The scripts of 370 respondents were scored and arranged in the ascending order based on the total scores obtained by the respondents. One hundred scripts getting the highest scores (top 27 per cent) and one hundred getting the lowest scores (bottom 27 per cent) were taken to form the upper and lower groups. These two groups provided the criterion groups for the purpose of item analysis. The scores obtained for each item by these two groups were used for calculating the discriminating power of each item. The discriminating power was obtained by calculating the 't' values using the formula recommended by Edwards (1969).

The final 'scale' consisted of items selected on the merit of their 't' values. Statements having 't' values significant at 1 per cent level ('t' 2.567 or more) were selected for the final 'scale'. To minimize the pos-

sible response-sets of subjects, both kinds of statements—positive and negative—were included. Statements were also chosen after giving equal weightage to various areas in the scale already mentioned.

MAS : Its Final Form

Eighty best discriminating items were thus selected having taken 16 statements (8 positive and 8 negative) from each of the five areas under study. The selected items in each area were rearranged more or less in the descending order of 't' value of discrimination shuffling the positive and negative statements without any perceptible order or pattern. Care was taken to keep related or similar statements at some distance from one another. Thus, emerged the final form of the scale—the Modernity Attitude Scale—preceded with an introductory note carrying instruction for respondents. The final 'scale' was subjected to statistical treatments in order to establish the norms, the reliability and validity.

Statistical Information Norms

Some Suggested Classifications

The overall score on the pool of 80 items can be considered as an appropriate estimate of individual's attitudinal modernity. The summated scores on the sub-scales can also be taken separately and used as a measure of the respective social attitude. The possible range of scores and 'cutting points' of absolute neutrality on the MAS and the sub-scales under the two systems of scoring are given in Table 2.

TABLE 2
POSSIBLE RANGE OF SCORES AND POINTS OF
NEUTRALITY OF FIVE SUB-SCALES OF MAS

Scale	No. of Items	System A		System B	
		Possible Range	Point of Neutrality	Possible Range	Point of Neutrality
Attitude towards					
1. Religion	16	16-80	40	-32 to + 32	0
2. Marriage	16	16-80	40	-32 to + 32	0
3. Family	16	16-80	40	-32 to + 32	0
4. Status of women in society	16	16-80	40	-32 to + 32	0
5. Education	16	16-80	40	-32 to + 32	0
Modernity Attitude Scale (MAS)					
	80	80-400	240	-160 to + 160	0

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The researchers can either make use of the raw scores directly or can convert the scores into percentile or standard scores (Thorndike and Hagan 1969). They are free to group the scores appropriate for their purpose of classification and form the desired/required number of classes on some standard basis. However, an arbitrary but logical classification of scale values useful as a sound frame of reference is given in Table 3.

TABLE 3
A SUGGESTED CLASSIFICATION (Arbitrary but Logical)
FOR SUB-SCALES AND THE MODERNITY ATTITUDE SCALE

Sl No.	Classes	Sub-scale Scores		Modernity Attitude Scale	
		System A	System B	System A	System B
1.	Extreme Negative	16 to 28	-32 to -20	80 to 143	-160 to -97
2.	Moderate Negative	29 to 41	-19 to -7	144 to 207	-96 to -33
3.	Neutral	42 to 54	-6 to +6	208 to 272	-32 to +33
4.	Moderate Positive	55 to 67	7 to 19	273 to 336	-33 to -96
5.	Extreme Positive	68 to 80	20 to 32	337 to 400	97 to 160

Another valid and scientific classification based on the sigma difference (mean and standard deviation) can also be attempted. A seven/five or three-pronged classification derived in terms of deviation from the mean is delineated below :

1. Below $M-2.5\sigma$
2. Between $M-1.5\sigma$ and $M-2.5\sigma$
3. Between $M-0.5\sigma$ and $M-1.5\sigma$
4. Between $M+0.5\sigma$ and $M-0.5\sigma$
5. Between $M+1.5\sigma$ and $M+0.5\sigma$
6. Between $M+2.5\sigma$ and $M+1.5\sigma$
7. Above $M+2.5\sigma$

Five classes can be obtained by merging the two extreme categories in the adjacent ones :

1. Below $M-1.5\sigma$
2. Between $M-0.5\sigma$ and $M-1.5\sigma$
3. Between $M\pm 0.5\sigma$

4. Between $M+1.5\sigma$ and $M+0.5\sigma$
5. Above $M+1.5\sigma$

Further, the classes can be brought down to three as :

1. Below $M-1\sigma$
2. Between $M\pm 1\sigma$
3. Above $M+1\sigma$

Percentile Scores

The percentile data on the MAS and the five sub-scales have been worked out. The data can be used as a table of norms while interpreting the scores. A framework of percentiles indicating the highest and the lowest cut-off scores coming at the two ends obtained for the norming sample is given in Table 4. Following the principle of proportionate division, a raw score falling in-between the cut-off points can suitably be converted into the percentile score.

TABLE 4
PERCENTILE NORMS OF FIVE SUB-SCALES AND
MODERNITY ATTITUDE SCALE

Percentiles	Religion	Marriage	Family	Women's Status	Education	MAS
Highest score	68	71	73	67	75	337
90th	63.5	66.2	69.5	63.3	71.4	333.9
80th	59.2	64.3	66.3	61.7	69.2	319.7
70th	55.4	61.4	62.7	59.6	67.8	306.9
60th	53.1	58.9	60.3	57.3	65.1	294.4
50th	51.9	55.3	57.4	54.5	63.5	282.2
40th	48.6	52.7	55.1	50.6	58.0	265.0
30th	44.8	49.0	53.2	45.1	55.7	247.8
20th	35.1	43.1	44.8	38.7	52.1	213.5
10th	27.3	36.5	38.2	34.4	45.3	180.6
Lowest score	21	32	34	30	42	172

Stanine Classes

Interpretation of the attitude scores in terms of the *stanine* classes

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is highly useful in empirical studies. With this end in view, the upper limits of stanine classes were calculated with reference to the norming sample. The scores that fell in each class (under the scoring scheme A) are presented in Table 5. Further, a verbal description of the nine classes from top to bottom has also been suggested below :

VERBAL CLASSIFICATION

Extremely Mostly	Modern Modern Modern	}	Modern
Trans- Transitional Trans-	Modern Traditional		Transitional
Mostly Extremely	Traditional Traditional Traditional	}	Traditional

TABLE 5
STANINE CLASSES

Class	%	MAS	Religion	Marriage	Family	Status of Women in Society	Education
IX	4	334..	65 ..	67..	71...	64....	72...
VIII	7	330-333	62-64	65-66	68-70	62-63	70-71
VII	12	305-329	58-61	63-64	65-67	60-61	68-69
VI	17	294-304	53-57	58-62	60-64	57-59	65-67
V	20	266-293	50-52	54-57	56-59	52-56	59-64
III	12	182-214	29-36	38-44	40-45	36-40	47-53
II	7	177-181	25-28	34-37	37-39	33-35	45-46
I	4	... 176	... 24	... 33	... 36	... 32	... 44

Technical Data

1. *Reliability* : For determining the reliability of the MAS the following two methods were applied : (i) split-half reliability, and (ii) test-retest reliability. The scores on the odd and the even items were taken separately on a sample of 100 subjects. The product moment coefficient of correlation was computed between the scores on odd and even items. The reliability coefficient thus computed was corrected applying Spearman-Brown prophecy formula (Garrett and Woodworth 1966). The

corrected reliability coefficients of the five sub-scales and the MAS are provided in Table 6

TABLE 6
SPLIT-HALF RELIABILITY COEFFICIENT OF THE FIVE
SUB-SCALES AND THE MAS

<i>Scale</i>	<i>Reliability* Coefficients</i>
1. Attitude towards religion	0.69
2. Attitude towards marriage	0.66
3. Attitude towards family	0.68
4. Attitude towards status of women in society	0.74
5. Attitude towards education	0.75
Modernity Attitude Scale (MAS)	0.76

*Values given after applying Spearman-Brown prophecy formula

The repetition (test-retest) method was also employed to compute the reliability. A group of 100 subjects was given the test and retested after 25 days of the first testing. In order to minimize the possible influences of intervening factors, the gap between the first and the second testing was purposely kept short as suggested by Noll (1957) and Freeman (1965). Pearson 'r' between the two sets of scores was computed. Test-retest reliability of the five sub-scales was also computed. The obtained test-retest reliability coefficients for the whole test and the five sub-scales are given in Table 7.

TABLE 7
TEST-RETEST RELIABILITY COEFFICIENTS OF THE FIVE
SUB-SCALES AND THE MAS

<i>Scales</i>	<i>Pearson 'r'</i>
1. Attitude towards religion	0.73
2. Attitude towards marriage	0.69
3. Attitude towards family	0.70
4. Attitude towards status of women in society	0.72
5. Attitude towards education	0.74
Modernity Attitude Scale	0.72

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The reliability tests employing the above two methods revealed that the MAS and the five sub-scales enjoy a high reliability.

2. *Validity*: The investigators depended on construct validity as this is often used in attitudinal testing (Edwards 1969). The content of the items depend on the theoretical writings on modernization by scientists like Inkeles and Smith 1974, Kahl 1968, Kunkel 1965, Rogers 1969, and Stephenson 1968. Further, proper care was taken at the time of constructing items to maintain validity and by item analysis this was further ensured. The high discriminatory power of items (higher than 2.58, significant at 0.01 level) is a testimony to its internal consistency.

The validity of the scale was assessed by finding correlations between the total scale score and the score on each sub-scale using the product-moment method. Computed values of Pearson 'r' ranged from 0.57 to 0.73 as reported in Table 8. High correlations show that the sub-scales enjoy high validity.

TABLE 8
CORRELATIONS OF THE SUB-SCALES SCORES WITH
TOTAL SCALE SCORE

<i>Sub-scales</i>	<i>Pearson 'r'</i>
Attitude towards religion	0.69
Attitude towards marriage	0.70
Attitude towards family	0.73
Attitude towards status of women in society	0.57
Attitude towards education	0.66

Inter-sub-scale correlations were also computed by the product-moment method to determine the validity of the scale. Table 9 gives details regarding inter-correlations between the five sub-scales.

TABLE 9
INTER-SUB-SCALE CORRELATIONS

	<i>Religion</i>	<i>Marriage</i>	<i>Family</i>	<i>Status of Women in Society</i>	<i>Education</i>
Religion	—	0.50	0.61	0.66	0.54
Marriage	—	—	0.67	0.42	0.56
Family	—	—	—	0.63	0.66
Status of women in society	—	—	—	—	0.67

Purposes and Uses

The MAS is a dependable tool in attitudinal research. It is useful for the social workers, guidance experts, and researchers and scholars in various fields of social science. The scale can be successfully used in analysing the social attitudes in the following ways :

1. To elicit the climate of opinion of the client on a specific social issue (child marriage, dowry, family planning, joint family, rights of women, co-education, women's education, sex education, belief in God, religious faiths, etc.) covered by an individual item or a pool of items on the scale.
2. Sub-scale scores can be obtained separately and may be used in an attitudinal study pertaining to any one of the social realms, namely religion, marriage, family, status of women in society and education.
3. The overall score is a measure of modernity though the index is purely attitudinal and social in nature and content.

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Concepts and Measurement of Literacy, Semi-Literacy and Illiteracy :

A Literature Review

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The purpose of this paper is to examine critically what constitute literacy, semi-literacy, illiteracy and how to measure them. The hope is to clarify these concepts and their applicability

EVERY human society has need for some form of communication among its members. A societal communication may be the use of sounds or signs that are mutually comprehensible to members of that particular society. Then, the use of visual symbols, for example, helps in the development of a written language. Societies that are able to communicate by using the written language stand to gain more than those that cannot do so. Unesco's 1956 study alluded to individuals and societies with or without such abilities of communication (Unesco 1970, p. 18) :

Thus an individual who possesses this ability (i.e. the ability to communicate by using the written language) is regarded as a 'literate' person, and one who does not possess this ability is considered as illiterate.

The report, in the same vein, refers to such societies as are able to have and use the written language as 'literate' and its counterpart that has not developed any such thing as 'non-literate' or 'pre-literate'.

The Advanced Learners' Dictionary of Current English refers to 'literacy' as "acquaintance with the alphabet and the ability to read and write". This view does not take into account the level of competence one should attain before being classified as 'literate'. Writing in the *Encyclopaedia of the Social Science*, Helen Sullivan (1933) had this to say :

Literacy . . . designates the ability to communicate through the medium of the abstract symbols of a script (p. 512).

One wonders whether communicating through the use of the script's abstract symbols alone should actually put one in the class of literate : or do we assume here that doing so from a script actually implies the 'vocal' (i.e. use of sound) aspect of the communication process ? If one's answer to this latter question is in the affirmative, there is no problem ; but if otherwise, the definition loses its strength.

Edwin Parker (1970) writing on 'illiteracy' in the *Encyclopaedia of Education* also had this to say :

A person is termed illiterate who can neither read nor write : a semi-literate is one who can read but cannot write (p. 366)

Parker introduced a new terminology, 'semi-literate'. Yet, the definition has failed to consider 'numeracy' that would have completed the whole concept of 'literacy'. The same limitation is found in the work of many scholars. For example, R.S. Laubauch and S.A. Mujahid writing in the *Encyclopaedia of Education* (1971) state :

Illiteracy may be defined in general terms as the inability to read and write a simple message in any language (p. 536).

The writers fail to take into account the degree of sophistication or otherwise of the society where the individual lives. The escapist usage of 'general terms' must be noted because it calls for moderation in our criticism. A similar definition of 'literacy' is contained in the recommendation of the United Nations Population Commission (1948) :

" . . . ability both to read and write a simple message in any language.

Apart from the fact that the definition sets a standard, its strength also lies in the fact that literacy can be expressed in any language. Such a broad

outlook adds to its applicability in different cultural settings. The definition does not include an element of numeracy. Yet, successful daily transactions depend not only on ability to read and write, but also on simple numeracy. Again, the definition is not specific on what constitutes the essential skills of literacy in one society may not necessarily be the same in another. Chaturvedi illustrates this point thus :

A person is termed literate in India if he could write hundred common words chosen from a basic text. While the recognition of four hundred Japanese words is accepted as literacy standard in Japan (*Chambers' Encyclopaedia*, 1969).

Lewis (1969) puts his conception of literacy and illiteracy thus :

An illiterate person is one who is unable to read or write (p. 379).

By implication then can we take somebody who can read or write as literate? We certainly cannot because literacy goes beyond that. Lewis saw the inadequacy in his definition and quickly added :

... it does not represent an internationally accepted measure of what has been recognised as the most serious single factor inhibiting peaceful and prosperous development (Lewis 1969 : 379).

Similar to the above definition is Unesco's conception of 'literacy' in the opening chapters of its survey titled *World Illiteracy At Mid-Century* (1970 : 18). There it is suggested that one is literate if he can write his name, or even a single number, e.g. '1', which can be understood by another person. Realizing the inadequacy in that definition, it quickly adds the phrase 'but barely so'. It has to be 'barely so' because how well he communicates with his fellow beings in writing is extremely restricted. In this same vein the Unesco's report (1970 : 18-19) agrees that:

... a person who can recognise his name in written form or a simple word like 'yes' or 'no', must also be considered as literate, though in an extremely limited way.

The limited conception of literacy, illiteracy and semi-literacy has permeated the work of many scholars. For example, Carlo M. Cipolla (1969: 11) takes the humblest interpretation of the word 'illiteracy' :

In its humblest sense the word illiterate may be employed to connote a person unable to read a text whether printed or in manuscript.

Taken seriously, one cannot say that such a person who can merely read a text is truly literate. To agree with that is to narrowly conceive 'literacy'. Explaining his conception further, C.M. Cipolla makes a distinction between the illiterate and semi-illiterate :

Between the totally illiterate and the literate there is the intermediate army of semi-illiterate. They are to begin with those who can read but cannot write (p. 11)

Cipolla is of the view that, apart from those who are unable to write, semi-illiterates also include those who can both read and write but can hardly understand what they read and can hardly write anything besides their signatures (p. 11). Cipolla's identification of such group of people gives us a better picture in understanding the concept of literacy and illiteracy, in that we now know that between the two extremes are the semi-illiterate. Then, in wiping out illiteracy semi-illiterates could be assumed to be totally illiterate. Unless they are aided to be completely literate in the functional sense, it is possible for them to fall back into illiteracy.

The conception of 'literacy' relative to time emerges from Cipolla's work. He declares .

Any definition of illiteracy (or literacy) is bound to be elusive when used in the context of a millenary story. What we define with one and the same term, historically, undergoes substantial changes in its social and cultural significance (p. 13).

To support this view, Cipolla cites the example of the Venice Seamen :

Around (1451-1453) these navigators were termed to be functionally literate, as regards the traditional techniques of navigation. But such skills became obsolete as soon as new techniques of open-sea navigation later developed (p. 23)

In other words, with time, literacy skills changed, and what used to be an acceptable standard in the fifteenth century was no longer acceptable. Furthermore, Cipolla is of the opinion that in conceptualizing 'literacy' attention needs to be paid not only to time but also to place where such skills are needed and the thoroughness of the techniques used in assessing who is literate and who is not. He declares :

When making international comparisons, we must obviously be aware of the fact that not only the definition of the term 'illiteracy'

may vary greatly from place to place, but also the care and the thoroughness with which the phenomenon is assessed differ considerably from one place to another (p. 15)

One shares the same view with Cipolla. For instance, where the literate census is taken by oral interview there are bound to be some mistakes. The illiterate respondent can indicate that he is literate in order to conceal the shame such impression can bring on him. In fact, the respondent's personality can be deceiving.

Like Cipolla, William S. Gray relates 'literacy' to the culture in which the individual operates. According to W.S. Gray (1956):

a person is functionally literate when he has acquired the skills necessary for activities in which literacy is assumed in his culture.

Cipolla and Gray's views constitute a basic fact in defining literacy. We all know that societies differ in term of development, be it economical, political or cultural development. What constitutes an acceptable standard in an advanced country like the USA may not be valid in a developing country like Nigeria. Thus skills needed will be different from time to time and place to place.

Gray's definition of literacy is broad in outlook, but the specific element of literacy are not stated. There is need to be specific in respect of what constitutes necessary skills. Distinction should also be made between basic and functional literacy.

Miller (1973) divides literacy into three levels : basic literacy, comprehension, and functional or practical literacy :

Basic literacy means the ability to use correspondences of visual shapes to spoken sounds in order to decode written materials and to translate them into oral language. *Comprehension* means ability to understand the meaning of verbal materials. *Functional or practical literacy* means ability to read (decode and comprehend) materials needed to perform everyday vocational tasks (p. 3).

The work of Miller provides a broad conceptual basis by which one can examine literacy components in the literature. However, the dichotomy into basic fundamental, of minimum and practical or functional literacy is prevalent in the literature. The discussion thus far contains these elements.

As a point of emphasis again let us first examine the presentation of basic or minimum literacy in the literature. The Expert Committee

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on Standardization of Educational Statistics, convened by Unesco in November 1951 (Unesco 1970) declared :

A person is considered literate, who can both read with understanding and write a short simple statement on his everyday life . . . semi-literate, who can read with understanding, but cannot write a short simple statement on his everyday life.

Here literacy, without numeracy, is conceived in a fundamental sense. This definition possibly influences some scholars who refer to minimum or basic literacy as international usage. For example, Murphy in the *Encyclopaedia of Americana* (1977) said :

Literacy is defined as the ability both to read and to write at least a simple message, illiteracy conversely is the lack of such ability (p. 775).

Jeffries (1967) describes his own definition in terms of the barest minimum of tasks the illiterate person is unable to accomplish :

The illiterate is a man or woman, who is condemned to a status which, in the circumstances of today, is less than human. The illiterate is a man who, having scraped together ten shillings to meet the tax collector's demand, cheerfully walks away with a receipt showing that he has paid five shillings. The illiterate is a mother who has to trust someone else to read her letters from her absent son and send him her replies. The illiterate is a farmer who cannot decipher the simple instructions which could save his crop from disaster. The illiterate is a woman whose baby is dying of some malady which the poster on the wall tells how to prevent or cure . . . The illiterate is . . . a man who can only count by his fingers (p. 13).

The conception of literacy at minimum level is far from being adequate to arm a person to function effectively in the modern complex society. Many nations and Unesco have based their literacy programmes on minimum standard. Adults have been taught how to read and write, without relating the acquired skills to practical uses.

Results have been measured in terms of the number of literacy certificates granted. No doubt, the idea of minimum literacy is still practised in many countries today. As soon as the programme is discontinued, the trainees are likely to revert to their pre-literate condition. In addition,

many who receive certificates make little or no subsequent use of their skills.

The fact that literacy is difficult to measure because of the different minimum standard adopted by different countries and the problem of relevance make experts decide on what could be the goal of literacy. The popular view is functionalism. For instance, Jeffries (1967) emphasizes the importance of functional literacy thus :

Minimum literacy is not much use except in so far as it may be developed into what is now termed functional literacy (p. 11).

Obviously, no exact or universal definition of this term is possible, but its meaning is clear through the functional dimension added to it. Basically there are two approaches to the definition of functional literacy. One approach considers the society in which the individual lives and the other deals with the individual. Therefore, most definitions are either directed at the individual and/or society. Quoting William Gray, C. Jeffries (1967) defines functional literacy thus :

A person is functionally literate when he has acquired the knowledge and skills in reading and writing which enable him to engage effectively in all those activities in which literacy is normally assumed in his culture or group (p. 11).

The definition can be judged adequate if the ability to engage effectively in all the activities in which literacy is assumed includes possessing skills of reading, writing and numeracy.

Referring to functional literacy, Laubach and Majahid in the *Encyclopaedia of Education* (Vol. 4, 1971) declare :

... a person is able to read and write at a self-sustaining level in his daily life and work ;

and has acquired, quoting Otto and Ford in the *Encyclopaedia of Education* (1967) :

... the essential word recognizing skills in reading and the letter forms in writing, and is able to use these skills as tools for obtaining information and expressing his own thoughts (p. 536).

Taking a cue, Jeffries (1967) states the qualities that an effective literate should possess :

. . . should at least be able to read a simple instruction leaflet in his own or some other familiar language, to write a legible letter, and to keep a record of his money transactions or the produce of his farm (p. 8).

. . . A person who can only read or only write (if indeed such a person exists) cannot, for any practical purpose, be described as 'literate'. Again, a person who has only learnt to sign his name, or to recognise his own name when he sees it written or printed, is at the barest minimum level of literacy (p. 10)

These passages show that Laubach, Majahid and Jeffries view functional literacy as something more practical than the minimum level of literacy. Sticht (1975) defines functional literacy as the :

possession of those literacy skills needed to successfully perform some reading task imposed by an external agent between the reader and a goal the reader wishes to obtain (p. 4)

In other words, one must be able to read something successfully in order to get a job to earn money to eat in order to survive. If a person has the reading skills sufficient to perform a job, that person is considered functionally literate. Functional literacy, according to Sticht's definition, is not based upon a person's skill level, but on the specific demand or difficulty of the reading task (Smith 1977 : 136)

According to Sharon (1973-74), during World War II, the U.S. army coined the term functional literacy which meant the capability to understand written instructions necessary for conducting basic military functions and tasks. The U.S. army thought a serviceman reading at the fifth-grade level then was considered functionally literate.

Bormuth (1973-74) views literacy as the ability to respond competently to real-world tasks. A literate person is one who can get needed information from materials which are read :

A person may be regarded as literate or illiterate only with respect to a particular reading task (p. 15).

For example, a person may or may not be literate with regard to reading any application.

Murphy (1975) uses the term 'component' instead of 'literate'. Yet, his definition is in the same framework as Bormuth's. Then, Murphy defines competence as those reading skills suitable for adequate function-

ing in normal day-to-day life. The definitions presented by Sharon, Bormuth and Murphy thus far appear to put emphasis on reading ability needed to perform life's task. Their definitions then are incomplete for lack of computation element.

Referring to functional literacy, John Lowe (1975) said .

- The education possessed by a person who has acquired, in the matter of reading and writing, the knowledge to enable him to take an active part in all the undertakings for which the individuals, forming part of the same group, generally agree that education is necessary (p. 93).

John Bowers, one time a Unesco literacy expert, says :

We must ask ourselves literacy specifically for what ?

Apparently dissatisfied with a loose definition, Bowers points out:

In other words, work-oriented functional literacy means technical/vocational training with a literacy component (John Lowe 1975 : 93).

The definition developed by the Right to Read Advisory Council (1973) is more comprehensive than those of the scholars mentioned above, but has some of the same characteristics. According to the Council :

A literate person is one who has acquired the essential knowledge and skills in reading, writing, and computation required for effective functioning in society, and whose attainment in such skills makes it possible for him to develop new aptitudes and to participate actively in the life of his times (Ahmann 1975 : 39).

According to the recommendation of the Joint Congressional Committee on Education of the Philippines in 1951, functional literacy should include :

The ability (a) to read and to interpret satisfactorily reading matter such as appear in (i) ordinary letters, (ii) newspapers, (iii) notices and signs, (iv) advertisements and (v) tax receipts ; (b) to write an ordinary letter. (c) to make computations with the four fundamental operations and solve problems of day-to-day living (Unesco 1970 : 24).

Unesco's definition, similar to those mentioned above states that a person is literate

when he has acquired the essential knowledge and skills which enables him to engage in all those activities in which literacy is required for effective functioning in his group and community, and whose attainments in reading, writing, and arithmetic make it possible for him to continue to use these skills towards his own and the community's development and for participation in the life of his country (Unesco 1963 : 39).

Furthermore, in initiating the Experimental World Literacy Programme, Unesco (1973) commented on the functional literacy thus :

Functional literacy is by no means confined to instruction in the rudiments of reading, writing and arithmetic; it constitutes a comprehensive, dynamic form of training designed to develop the economic and social aptitudes of individuals and thereby, their personality as a whole (p. 24).

It is abundantly clear from the evaluation of the Experimental World Literacy Programme that Unesco has expanded considerably its conception of functional literacy a great deal :

, . . to be effective, functional literacy should deal with political, cultural and social aspects of development as well as purely economic ones (Unesco 1976 : 35).

Unesco provides us a clear example of how literacy concept changes with time. A lot of changes have occurred from 1950's to 1970's. The skills needed in the fifties obviously could not meet the demand of the seventies. An early HEW report on Literacy Education (1953) notes this point:

As the speed and complexity of our civilization increase, the need for a high degree of literacy increases. As the means of transportation and communication grow, populations become increasingly mobile, intermingled, and interdependent. This creates an environment which demands an increasing facility in the act of communication - reading, writing, speaking, listening, interpreting, and understanding (p. 1).

In supporting the same view, Resnick and Resnick (1977) state thus .

... to the extent societies change, persons who may be classified as literate at one time and in one society may not be so at another time or in another society. Thus, scores on the measures of functional competencies merely denote an individual's level of functioning at a specified point in time his classification can be expected to change through the interaction of acquiring additional skills and the changing demands placed on him by society (p. 492).

Commenting on 'literacy' in the United States of America, Hunter and Harman (1979) point out .

As the number of those with educational credential increased (however) so did the basic requirement for the same job increased (p. 19).

The problem is not peculiar to the United States of America alone. In developing countries there is an upward trend in the quality of certificate needed for a particular job. For example, in Nigeria, about three decades ago the holders of the Standard Six Leaving Certificate were regarded competent enough to teach in primary schools. Later they were replaced by the teachers with Grade III certificate holders. In turn, Grade III teachers are almost phased out. They are being replaced by the Grade II teacher certificate holders.

Another dimension in the definition of 'literacy' is to talk of standard and measurement of accomplishment (Fisher 1978). The subsequent discussion is devoted to examination of different measures and their examples.

Ability to read or write simple statement : This has been mentioned earlier in this paper. Harman (1970) cites Unesco's attempt to define literacy simply in terms of :

a person . . . who can, with understanding, both read and write a short, simple statement on his everyday life.

In like manner, before 1940, the Bureau of the Census in the United States of America narrowly defined 'illiteracy' in terms of people's response to the question whether they could read or write a simple message in English or some other language. In fact, they originally dealt only with the ability to write (Kirsch and Guthrie 1977-1978). As it has been pointed out in the previous discussion, this kind of measure is rudimentary as well as inadequate to cope with the concept of 'literacy' in time

and place. Realizing the shortcomings of this measure, Unesco and the USA Bureau of the Census proposed other measures

Educational attainment deals with the number of years of school completed. Using a criterion of completion of six or more years of school, the USA Bureau of Census classified US population into 'literate' and 'illiterate' in 1959 (Bureau of Census 1960 and 1963). Unesco contends that four years of primary schooling are the minimum requisite for attaining permanent literacy (Smith 1977, p. 136). Studies have shown that there is a weak to moderate relationship between educational attainment and various cognitive skills. For instance, Sticht (1975) observed that, for a sample of army personnel representing a range of job skills, the correlation between education and reading was .30. Jencks (1972) reported that the correlation between educational attainment and adult test scores ranged between .60 and .70. These statistics indicate that at best educational attainment accounts for only 50 per cent of the variance in various cognitive skills (Kirsch and Guthrie 1977-78: 494). Then, it appears that as societies develop technologically, educational attainment may not be a sufficiently accurate record of specific competencies of individuals to be useful primarily as an index of functional literacy levels.

Grade equivalents : The term deals with the amount of 'literacy' associated with a particular grade level. In more recent years, the USA Bureau of Census has used a grade level criterion to decide to whom to ask their question. All those above the criterion are classified as non-illiterates, along with those people responding 'yes' to the question (Kirsch and Guthrie 1977-78: 493). The Bureau uses a fifth-grade equivalency to distinguish functional literates. Sticht (1975) reported a difference among the average readability of selected reading material for several army jobs. The average grade level equivalency of daily reading material ranges from 9.0 for cooks, to 14.5 for repairmen, to 16 for supply specialists. Additionally, Bormuth (1975) cites a study in which he gave a close reading task to children in grades 3 through 12. He found that on the average article drawn from news publications, only 33 per cent of the students in grade 6 and 65 per cent of the students in grade 12 were able to reach a criterion of 35 per cent correct. From other work, he states that those who are unable to attain this criterion gain little or no information from their reading materials. Then, there appears to be no information from which to conclude that fourth, sixth, or even eighth grade equivalency scores are sufficient for adequate performance with real life reading tasks.

Survival literacy study : Louis Harris and associates (1970), commissioned by the National Reading Council of the USA conducted a

study aiming at determining the percentage of Americans lacking the functional or practical reading skills necessary to 'survive' in the country. The goal was operationalized in terms of responses to five types of application forms selected on their utility and frequent appearance in society. These included applications for public assistance, for medical aid, for driver's license, for a personal bank loan, and for an identification form, similar to that required for a social security number. The forms were altered to "assure that the study measured reading ability and not the layout of the form" (Krisch and Guthrie 1977-78).

The study was based on a stratified random sample of 1,685 persons in the civilian non-institutionalized population 16 years of age and older. The results estimated that 4.3 million Americans fell into the 'low survival threshold' group (those averaging more than 30 per cent incorrect responses); 7.1 million into the 'questionable survival threshold' group (those averaging more than 20 per cent incorrect responses); and 18.5 million into 'marginal survival threshold' group (those averaging more than 10 per cent incorrect responses).

There are flaws in the study. It raises questions of reliability, validity and range of 'survival literacy' behaviours. In fact, no empirical rationale was given for selecting the criteria to distinguish among the four levels of literacy or for behaviours and skills sampled (Caughran and Lindof 1972). Nevertheless, the results of the study indicate 'survival literacy' to be differentially associated with race, age, sex, income and region of the country. The study includes practical reading tasks. It suggests certain criteria for success at corresponding levels of 'survival literacy', being the first study which attempts to represent literacy on a continuum of competencies rather than as a dichotomy.

Adult performance level : In an effort to identify basic skills and knowledge required for functional living, Northcutt and his associates on the Adult Performance Level (APL) Project (1975), developed a taxonomy of content areas and skills which seem to account for the majority of requirements placed on individuals. The content areas consist of community resources, occupational knowledge, health, government and law. The skill areas include communication skills (reading, writing, speaking and listening), computation skills, problem-solving skills and interpersonal relation skills. Essential to their theory of 'functional competence' is the assumption that competence is related to success in adult life. Success was operationalized in terms of income, education and job status. A total of 42 items which correlate positively with 'success' were selected and comprise the test.

Results show that approximately 20 per cent of the USA adults 18 to 65 years of age were 'functionally incompetent' (APL 1), and another third were functioning with difficulty (APL 2). Fifty per cent of the population were estimated to be functionally competent (APL 3). The results are similar to other measures in this paper. The only reversal is that more women are found to be functionally incompetent and functioning with difficulty than men. The investigators considerably improved upon previous efforts in specifying the range of behaviour which should be included in a definition of adult competency. Yet, there are flaws in the study: The investigators did not specify what the criteria are for distinguishing among the three proficiency levels (APL 1, 2 and 3). It is not clear whether income, education and job status are the criteria used to determine their three proficiency levels or if they merely describe the probable 'success' of persons categorized at these levels. It is necessary for one to question the measure of success and its association with individual needs to exhibit to be competent in society and how these behaviours are associated with income, education, and job status. These questions are not the same (Kirsch and Guthrie 1977-79: 499). However, they are not treated as independent on the APL study.

Moreover, the utility of the APL measure as an assessment of something other than competencies which are functional to economic and educational success is questionable. It appears that further research needs to emphasize methods for generating a representative set of items which are relevant to adult competency and not adult income, education, etc. It appears that a rationale needs to be developed for criteria to be used in assigning cut-off scores to distinguish among individuals with various levels of competencies.

R/EAL (reading/everyday activities in life): This is a criterion-referenced test developed by Lichtman (1974). The test samples from a domain which contains nine areas of practical tasks. These include sets of directions, maps, application forms, and technical documents. The results of a factor analysis of the items indicate the presence of three factors suggested to be at least partially influenced by the content and format of the material. The information provided is limited. Hence, very few conclusions can be drawn from the study. However, before using the measure, the range of behaviours sampled by the items should be reviewed in order to determine, among other things, their relevancy as indicators of functional literacy.

Adult functional reading study: This is a programme funded by the Office of the NSA Education's Targeted Research and Development Programme on Reading (Murphy 1973). The objective is to obtain des-

criptive information relating to the reading activities and skills among American adults. The study divided reading activities into 13 general categories: readings that involved books, newspapers and magazines. These were classified independently of where the activity took place. Reading activities for the remaining 10 categories were classified according to the place where the activity occurred or the general class of the activity. They included at school, at work, church or club, recreation or free time at home, working around the house, shopping, theatre or games, travelling or commuting and at meals. These general categories were further divided into sub-categories, e.g. newspapers were broken down to include main news, local news, editorials, comics, and nine other specific activities.

Results from the survey show the percentages of readers engaged in each of the 13 categories. Reading newspapers was the most popular type of reading activity (reported by 73 per cent of the respondents). Following in the order of frequency were reading activities involving travelling or commuting (70 per cent), recreation (54 per cent) mail at home (53 per cent), working around the house (46 per cent), at work and at meals (42 per cent), magazines (39 per cent), books and shopping (33 per cent), church or club (10 per cent), at school (5 per cent), and games or theatre (4 per cent).

Adults completing the survey also rated the importance of each reading activity. An index of the proportion of persons engaged in a general activity (newspapers) who rate a specific activity (e.g. editorials) as very important is constructed. Using this index, the most important reading activities related to (a) price, weight and size of information read while shopping, (b) street and traffic signs read while travelling, (c) main news read from newspapers, (d) writing contained on packages and labels read while shopping, (e) manuals and written instructions read at work, (f) forms, invoices, and accounting statements at work, (g) tests, examinations, and written assignments at school, (h) letters, memos, and notes at work, and (i) local news in the newspapers.

Furthermore, to determine the skill of American adults a set of 170 tasks was administered to 7,596 persons representing a national sample of adults 16 years and older. Each reading task was classified into 1 to 8 benefit categories and 1 of 9 formats in which the task appeared. Items are classified on the benefit scale as occupational and maintenance. Under 'occupation', tasks were included that referred to sick leave, discrimination information, employment applications and employment benefits. 'Maintenance' tasks contained items relating to common signs, train schedules, traffic signs, and recipes. The result shows that almost

one out of the five respondents could not complete reading tasks involving a table of contents, common signs, and train schedules. One of the four respondents could not complete tasks classified as occupational.

The study provides a better attempt at measuring adult functional reading. It suggests that there is no clear construct of 'occupation' or 'maintenance', since the variation within each classification is high. Again, the study provides us no knowledge concerning the reading demands of various items. We have little insight into the factors that are related to rating a specific activity as 'very important'. It is not clear how the index relates to the categories of benefit used in distributing the final set of reading tasks. Performance on functional reading tasks was not analysed to provide generalizations. No attempt was made to estimate literacy levels for different populations or different benefit categories, such as occupation and health. There is no reading requirements yet for legal documents, food labels, or notices commonly found at work. The study puts emphasis on the content to be included in defining literacy and measures for assessing them. We also need to acquire knowledge which relates to the readability of the functional tasks.

NAEP's mini-assessment of functional literacy (MAFL): The MAFL, conducted by National Assessment of Education Progress (1974), attempted to select items which were representative in content and format of the reading materials "frequently encountered in everyday life and with which we must be able to cope if we are to be able to function adequately" (p. 1). The formats included passages, drawings, pictures, signs, labels, coupons, charts, maps, graphs, forms, and reference materials. Evaluation of these formats encompassed a range of behaviours which included: the abilities to understand word meaning, to glean significant facts, to comprehend the main idea and organization, to draw inferences, and to read critically. The test was administered to a national sample of 17-year-olds enrolled in school in 1974. Results were tabulated by region, sex, race, parental education, size and type of community.

The result shows that, on the average, all groups performed best on the graphic materials format, which included drawings, pictures, signs, labels, and coupons. The next best performance was with charts, maps and graphs. Across the behaviours all groups performed best on understanding word meanings and least well on drawing inferences. The results were estimated by computing the mean percentage correct and adjusted to the highest expected level of performance (HELP), determined by a sample of superior readers.

The main percentage correct values were the average percentage of the HELP score for each format and each behaviour sampled. The results indicate that on the average these adjusted values are 90 per cent across formats and across behaviours. This means that groups are answering correctly as average of 90 per cent of the exercise sets of superior readers.

By design, the study assumes that functional literacy is defined in terms of the performance of the sample of superior readers, which seems unduly restrictive. The report does not provide any suggestions as to how various percentages of HELP might relate to various operationalized levels of competencies and consequences which might be associated with them. The implication is that any meaningful assessment of functional literacy needs to specify both behaviours and the criteria for success (Bormuth 1975).

Job literacy demands: Here functional literacy is defined in terms of reading tasks in a job-related context. Sticht (1975) employed several strategies which measured the reading demands of selected army jobs. These involved estimating reading grade levels of job reading materials. Readability estimates were made on written materials containing information specified as being needed by an individual to obtain or maintain his job classification. FORECAST, a readability index was developed. This assigns grade level scores to selected job materials as a function of the proportion of monosyllabic words contained in the materials. It was applied to written materials used by supply specialists.

A second approach in estimating demands involves scores on tests comprised of reading materials. These materials are frequently reported by persons serving in various army jobs as being used in their day-to-day work. Using these materials, Sticht constructed written tests that stimulated job demands. The tests were administered to men with various reading levels working as cooks, repairmen, and supply specialists. If 80 per cent of the men at a given level obtained 70 per cent of the items correct on a set of materials, the set was assigned the reading level of that group. With this criterion, the reading demands of materials for cooks were in the 7.0 to 7.9 range ; for repairmen, 8.0 to 8.9 ; and for supply specialists, 12.0 to 12.9. The study demonstrates the need to go beyond traditional literary measures.

The study has some limitations : FORECAST is not sensitive to the different types of reading that may occur with job-related materials. Literacy comprehension is not distinguished from inferential. Neither of the strategies presented measures the extent to which various jobs require reading skills. Sticht (1975) found near-zero correlations bet-

ween supervisors' ratings and standardized reading scores for cooks, repairmen and supply specialists. This suggests that other competencies are at least as important to occupational success as reading. In addition, Sticht's work points to the need for developing decision rules to assign cut-off scores on performance for job reading materials.

Conclusion

The discussion thus far reveals several forms of literacy : basic literacy, permanent literacy and functional literacy. Survival literacy is probably a sub-set of functional literacy. Those tasks that are commonly needed by everyone, such as skills of reading, writing and numeracy, should be included in the definition of basic literacy programme. Specialized tasks could then be included in the definition of functional literacy programmes designed for those who seek specialized training. Functional illiterates refer to persons who can read to some degree, but may not be able to read well enough to function effectively in their particular occupation, their community or society. This group of people may have achieved what Harman (1970) refers to as permanent literacy, yet may not have achieved functional literacy. One gets the impression from the preceding discussion that a hierarchy exists within the concept of literacy. More research activities are needed to make explicit the relationship among the terms that describe 'literacy'.

One cannot but agree with the recent concept of 'literacy' expressed at the International Symposium for Literacy (1975) :

The declaration considered literacy not just the process of learning the skills of reading, writing and arithmetic but a contribution to the liberation of man and his full development.

The implication is that literacy does not end at its basic form, but leads to self-fulfilment and self-actualization in life. Fulfilment here refers to meeting the needs in terms of contributing to one's personal development as well as to the advancement of one's society.

The numbers or percentages involving in literacy depend upon a common reference point or base-line. The measurement of the scope of the problem depends upon a stable or static definition. If that reference point is a moving average, then, accuracy in estimating literacy or illiteracy or semi-literacy will always be relative (Smith 1977). The implication is that the relative nature of the concept of literacy changes with

time, place and culture. This makes an internationally accepted standard of 'literacy' hard to come by, as stated by Otto and Ford in the *Encyclopaedia of Education* (1967 : 3) .

A uniform level of literacy is however neither equally appropriate for nor applicable to all areas of the world.

Therefore, whatever yardstick is used, literacy should be related to the society in which such skills are needed.

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Non-enforcement of Conditions of Affiliation in Colleges of Education

A Study of Reasons

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TEACHER EDUCATION programmes in the country have been vehemently criticized time and again for its various weaknesses by all important commissions and committees. These include University Education Commission (1949), Secondary Education Commission (1953) and the Education Commission (1966). The Education Commission, in its report, pointed out that "the quality of training institutions remains, with a few exceptions, either mediocre or poor. Competent staff are not attracted; vitality and realism are lacking in the curriculum and programme of work which continue to be largely traditional; and set patterns and rigid techniques are followed in practice teaching with a disregard for present day needs and objectives. A comprehensive programme for teacher improvement is urgently needed in teacher education". Several efforts are being made to improve the standards in teacher education. The Government of India also realized the need to bring about reforms in teacher education and set up the National Council for Teacher Education in 1973 which has since been taking some steps in this direction. However, some major weaknesses in teacher education still continue to exist in the country.

AFFILIATION IN COLLEGES OF EDUCATION

In addition to above, there are some other weaknesses like lack of resources, inadequate physical facilities—building, libraries and laboratories, hostel facilities, staff quarters, service conditions of staff, proper utilization of resources and facilities. This leads to inadequate preparation of teachers which, in turn, affects adversely the quality of school education in the country. There is, therefore, a need to improve the quality of teacher education programme by way of removing the existing weaknesses. Thus the major weaknesses in the teacher education programme may be summarized as outmoded curriculum, ineffective student teaching programme, unscientific system of evaluation, lack of competent and suitable staff, lack of physical and human resources, under-utilization of resources, etc. The responsibility of maintaining standards at secondary teacher education level lies with the universities. The university ensures maintenance of standards by laying down certain conditions of affiliation to be fulfilled by an institution at the time of seeking affiliation. The conditions of affiliation and their enforcement by the university and fulfilment by the institution play a vital role in maintaining the quality of teacher education programmes.

Universities are autonomous organizations. They prescribed their own conditions of affiliation and procedure for enforcing them. There are, therefore, variations in conditions of affiliation from university to university. The methods and machinery of enforcing also differ. Under these circumstances, the standards of teacher education not only differ from university to university but they are also very low as discussed earlier. It is felt that the conditions of affiliation laid down by different universities and their enforcement are among the major factors affecting the standards of teacher education programme in the country. It was, therefore, considered desirable to undertake a study of conditions of affiliation laid down by different universities for affiliation of colleges of education and to investigate the reasons for their non-enforcement by the universities. The need to look into the conditions of affiliation did attract the attention of some educators before.

Review of the Work Done

Realizing the need for bringing about improvement in teacher education, some efforts were made from time to time to study the weaknesses in teacher education programmes and conditions of affiliation laid down by different universities.

The University of Kerala appointed a General Inspection

Commission in 1965 to assess the adequacy of facilities available in the training colleges of Kerala, to suggest improvement, and to look into the question of opening new training colleges in the light of demand for trained teachers. The Commission, which visited 19 secondary teacher training institutions, found the accommodation in the training colleges unsatisfactory, inadequate library and laboratory facilities, inadequate strength of teaching staff and an unsatisfactory procedure of selecting candidates for admission. It also found that only a few members of the staff were adequately qualified. The report of the commission further reveals that many of the training colleges had no hostels and wherever this facility was available, it was not satisfactory. The commission, *inter-alia*, recommended the maximum strength of a training college as 120 students, and a teacher-pupil ratio of 1 : 12. It also recommended that if an increased demand for trained teachers makes the opening of a college absolutely necessary, the responsibility for doing so may be shouldered by the government or the university.

Sabharwal and Khosla (1974) studied the terms and conditions of affiliation in 24 universities. Sapra and Singh (1976) also studied the conditions of affiliation/recognition as laid down by 29 universities. The study *inter-alia* revealed that most of the universities did not prescribe specific conditions of affiliation for teacher training colleges. The conditions laid down for arts and science colleges are made applicable to colleges of education also.

In the USA, there exists a voluntary agency known as National Council for Accreditation of Teacher Education (NCATE). It develops standards on the basis of which it accredits teacher education institutions. The Council has played an important role in ensuring minimum standards in teacher training colleges. It is evident from review of the work done regarding conditions of affiliation that it is neither sufficient nor comprehensive. No study has been done with the objectives with which the present study has been undertaken.

Objectives of the Study

The study was conducted with the following objectives :

1. To study the conditions of affiliation laid down by different universities.
2. To identify the conditions which are not enforced properly by the universities.

- 3 To investigate into the reasons for non-enforcement of conditions of affiliation.
4. To make recommendations for proper enforcement of conditions of affiliation.

Delimitations of the Study

The following were the delimitations of the study :

1. It was restricted to the study of conditions of affiliation related to B.Ed. course only.
2. It covered only the affiliated colleges of education and departments of education attached to postgraduate colleges.

Design of the Study

The main purpose of the study was to investigate into the reasons for non-enforcement of conditions of affiliation laid down by universities for colleges of education. The data required for the study, therefore, included obtaining documents like statutes and ordinances of the university, conditions of affiliation prescribed by each university, inspection reports, and ascertaining reasons for non-enforcement of conditions of affiliation from concerned university registrars and deans of faculties of education. Data were also required regarding availability of physical facilities and staff in the light of prescribed conditions of affiliation and the reasons for non-fulfilment of conditions according to principals, heads of education departments and teaching staff

It is obvious from the above that documents such as conditions of affiliation, inspection reports, statutes and ordinances could be collected from the universities by post. However, it was not feasible to obtain the reasons for non-enforcement and non-fulfilment of conditions of affiliation without interviewing the concerned officials both in the universities and colleges of education.

The Sample

The population for the study consisted of universities having

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colleges and departments of education affiliated to them in the selected states. The universities which formed the sample were taken from four states selected on a random basis. The sample from universities in each of the four states was selected keeping in view the following factors. (i) location of the university, (ii) period of existence of the university, and (iii) expected variations in conditions of affiliation. Universities thus got selected in each of the four states in the sample are mentioned below :

<i>S.No.</i>	<i>State</i>	<i>Universities</i>
1.	Kerala	(i) Kerala (ii) Calicut
2.	Andhra Pradesh	Andhra University, Waltair
3.	Uttar Pradesh	(i) Rohilkhand (ii) Kumaun, and (iii) Meerut
4.	West Bengal	(i) Calcutta (ii) Burdwan and (iii) North Bengal

One college from each selected university was taken randomly for case study from the colleges affiliated to a particular university. Thus nine colleges/departments of education in postgraduate colleges got included in the study for conducting case studies.

Tools used

The following tools were used in the study :

Questionnaire

A questionnaire was developed to collect factual data from the teacher education institutions included in the sample. The questionnaire contained items on various aspects related to the conditions of affiliation. The items sought information about the nature of the institution, affiliation position, managing committee, enrolment, courses of study, experimental school, staff, building, hostel facilities, library, laboratories, etc.

Interview Schedules

Structured interview schedules were used to elicit reasons for non-enforcement of conditions of affiliation from registrars, deans of faculties of education and principals of colleges of education,

Data Collection

The data for the study were collected in two stages. In the first stage, the data were collected by questionnaire from teacher education institutions belonging to different universities which formed the sample. The questionnaires were scrutinized and additional information to be collected was noted so that it could be obtained at the time of visit to the college. The second stage of data collection included interviews with the concerned university registrars, deans of education faculties, principals of the colleges selected in a particular university and heads of education departments in the colleges. Some staff members were also interviewed, where possible. Facilities available in the colleges were seen by the investigators in the light of conditions of affiliation laid down by the university and the information supplied by the institution in the questionnaire.

Analysis of Data

Conditions of affiliation laid down by nine universities referred to earlier were studied with a view to finding out whether these are comprehensive so as to include all aspects of an institution. The study of these conditions have revealed that these are generally perscribed for such aspects of an institution as the building, teaching and other staff, selection procedure of staff, provision of library and laboratory and equipments in them, constitution of management committees, etc. However, an analysis of the conditions of affiliation with regard to building and equipment in library and laboratories revealed that universities have not laid down specific and detailed requirements in this regard. They seem to be satisfied by laying down that the building should be suitable and sufficient and library and laboratories should be properly equipped. The provision of hostel facilities in the colleges seeking affiliation is not a condition of affiliation in all the universities. Besides some of the universities which have perscribed this as one of the conditions, have not

laid down the minimum percentage for which these facilities should be provided. As regards teacher-pupil ratio in the colleges or departments of education, universities in U.P. have laid down that it should be 1 : 14 whereas universities of Calcutta, Burdwan and North Bengal have not made any specific provision in this regard. The review of the conditions of the affiliation further revealed that these conditions differ from state to state and in some cases from university to university.

Facilities of buildings for classrooms, laboratories, libraries and hostel were found inadequate in most of the colleges of education included in the study. The number of books and journals in libraries of these institutions were also found to be grossly inadequate. The teacher-pupil ratio was found to be generally higher than the desirable and in some cases, it was as high as 1 : 40. The procedure of selection of staff in non-government institutions is generally such that the managements play a decisive role. It was, however, noticed that physical facilities, teacher-pupil ratio, etc. are better in government and independent colleges of education than in non-government institutions and departments of education in the arts/science colleges.

In general, it may be said that conditions of affiliation are not adequate and many of them are not fulfilled. On the basis of their study and visits to the universities and colleges of education, reasons have been identified which are given in the findings that follow.

Findings and Recommendations

The following are the main findings of the study including the reasons for non-enforcement of conditions of affiliation laid down by the universities. Recommendations for improvement of the existing conditions and their proper enforcement have also been made

Lack of Comprehensive Conditions of Affiliation

It was noticed that conditions of affiliation laid down by most of the universities are not comprehensive and specific. This leads to subjective assessment by the inspection team of the university of the required facilities to be made available by an institution seeking affiliation. It is, therefore, obvious that non-availability of detailed conditions of affiliation seems to be the major reason for their poor enforcement. It is, thus, very essential to have comprehensive and specific conditions of

affiliation to improve standards in teacher education for their proper enforcement.

Absence of Specific Machinery

Most of the universities do not have any specific machinery for proper enforcement of conditions of affiliation. This results in non-enforcement of some of the conditions which are assured to be fulfilled at the time of granting temporary affiliation. Only the universities of Calcutta, Burdwan and North Bengal, have made provision for the posts of inspectors of colleges. Their functions include inspection of colleges for grant of affiliation and other allied matters in this regard. However, it was found that the inspectors of colleges were so much engaged in other duties that they found little time to pay adequate attention to the task of enforcement of conditions of affiliation.

Provision of Temporary Affiliation

Some universities have provision of granting temporary affiliation to the newly started colleges of education provided that the latter will fulfil the remaining requirements within a specified period. It was observed that once an institution is granted temporary affiliation, it is never withdrawn even though all the conditions of affiliation may not have been fulfilled. This results in non-fulfilment of some conditions even after an institution is permanently affiliated to the university as revealed from some inspection reports. It is, therefore, recommended that the practice of granting affiliation to institutions on a temporary basis may be stopped. Affiliation may be given only after all the required conditions are fulfilled.

Greater Autonomy to Certain Types of Institutions

Training institutions are managed by different agencies such as the state government, university departments of education and private managements. Private managements include institutions run by minority communities, associations and certain religious trusts. It is noticed that universities concerned are not able to enforce properly and uniformly the conditions of affiliation in these differently managed institutions in the same manner due to greater autonomy granted to certain types of institutions under constitutional provisions. It is suggested that some ways and means may be found so that autonomy granted to certain types of

institutions does not come in the way of enforcing the conditions of affiliation in the same manner in all kinds of institutions.

Different Types of Institutions

The B.Ed. course is run in different types of institutions as independent colleges, university departments of education and as a department in an arts/science college. It is observed that universities are not able to enforce properly the affiliating conditions particularly in B.Ed. departments of arts/science colleges because most of the facilities are not provided separately for B.Ed. departments. The department has to share facilities such as laboratories, library, auditorium, play-ground, hostel, etc. along with other departments of the college. This indicates that having B.Ed. course as part of an arts/science college stands in the way of enforcement of conditions of affiliation. It is, therefore, desirable that B.Ed. course should be allowed either as a department of education in a university or in independent colleges of education only. This would enable the universities to enforce the conditions of affiliation more effectively.

Separate Conditions for B.Ed. Course

Universities usually do not lay down separately the conditions for B.Ed. course. Conditions of affiliation prescribed by the universities for arts and science colleges are not suitable for a professional course like B.Ed. This leads to inadequate provision of certain facilities required for proper preparation of teachers. It is suggested that conditions of affiliation for B.Ed. colleges should be laid down separately keeping in view their specific requirements.

Lack of Coordination among Different Controlling Agencies

Different agencies dealing with teacher education are the state department of education, the university and the management. It is observed that there is a lack of coordination among these agencies. These agencies usually have different aspects of colleges of education to look after. The main aspects are the administration, finances and the academic functions of colleges. The day-to-day administration is looked after by the management in case of private colleges and by the principal in a government college, the grant-in-aid is provided by the state government and the academic aspect is looked after by the concerned

university. Lack of coordination between these agencies hinders the smooth functioning of the colleges.

UGC Grants to Colleges of Education

According to the University Grants Commission rules, any college with enrolment of more than 500 students only are eligible for UGC development grants. No independent college of education fulfils this condition and does not, therefore, get any such grant. The arts colleges with B.Ed. departments get UGC grants but it has been noticed that B.Ed. departments often do not get equitable share of grants from the college so as to meet the requirements of a professional course. It is, therefore, recommended that the UGC may modify its rules and make separate allocation of development grants for colleges of education and B.Ed. departments.

Revision of Conditions of Affiliation in Newly Opened Universities

It was noticed that the new universities often continue to use the conditions of affiliation of other universities from which the new university has been created. It was seen that the universities like Rohilkhand, North Bengal, Burdwan, Kumaun, visited by the authors, have neither laid down their own conditions of affiliation nor have revised them to suit their own needs. If a new college is to be affiliated, the old conditions are applied. It is, therefore, recommended that the new universities may immediately after their establishment revise the conditions of affiliation in the light of their needs and enforce them properly.

Inadequate Procedure of Inspection of Colleges

It is found from a study of the inspection reports that the inspection team is often not provided with specific and detailed conditions of affiliation. It is, therefore, not able to examine all the aspects in detail and makes its recommendations on the basis of its own perception of requirements for a training college. Sometimes the inspection team recommends a provisional affiliation by asking the colleges to fulfil certain requirements in a given time. This practice is not desirable. It is, therefore, recommended that inspection of colleges for purpose of affiliation may be made more comprehensive and objective. This may be done by developing an elaborate proforma including all the necessary aspects of requirements and conditions.

The composition of inspection team is generally not defined. Sometimes, the team consists of one member only and sometimes two or three. The observations of such a team are likely to be more subjective particularly when the conditions of affiliation are not specific. There is also a possibility of social and political pressures to be brought upon when the inspection team consists of one or two members only. It is, therefore, recommended that the inspection team may consist of at least three educationists. Of these, at least one may be from an institution/department of education located outside the jurisdiction of this university

Curtailment of Powers of Managements

In the recent years, some state governments and the university concerned have started direct disbursement of salary to the teachers and have curtailed some powers of managements in the matter of selection and removal of teachers. Thus, the vested interests of managements are not allowed to work to some extent. Therefore, the managements have started losing interest in making efforts to fulfil all the conditions of affiliation. Moreover, once a temporary affiliation is secured by a management, it does not care very much in fulfilling the unfulfilled conditions of affiliation.

Social and Political Pressures

The investigators during the interviews and discussion with the university officers, deans of education, principals and teachers were given to understand, sometimes directly and sometimes indirectly that one of the important reasons for non-enforcement of conditions of affiliation were the social and political pressures in different forms. These pressures are generally expected at the time of opening a new institution, in seeking affiliation to the university, in the selection, appointment and dismissal/removal of teachers and admission of students. It is obvious from the above that there is an imperative need to minimize the social and political pressures as much as possible. One of the ways to achieve this goal may be to authorize the National Council for Teacher Education or the UGC at the national level to ascertain the fulfilment of all the required conditions of affiliation before a university grants affiliation to an institution.

Roles of the State Government and University in Opening New Institutions

Whenever a new college of education or department of education

AFFILIATION IN COLLEGES OF EDUCATION

in a degree college is to be started by a private management, permission to start the class is to be sought from the state government. It was informed that the state government grants permission to start the new course/institution, sometimes without making sure whether the institution concerned has fulfilled or not all the required conditions of affiliation laid down by the university. In such cases the institution generally starts the classes without meeting all the requirements of the university and without getting prior affiliation. Once a course is started and students are admitted, the university has to grant at least temporary affiliation to it even if the conditions are not fulfilled completely. This gives rise to a situation in which certain conditions of affiliation either remain unfulfilled for a long period or sometimes not fulfilled even after the permanent affiliation is granted. It is, therefore, suggested that the following procedure may be adopted for granting affiliation to new institutions or courses :

1. The university may work out the conditions of affiliation in consultation with the state government and specify the staff requirements, etc. so that the government may also revise its policy of making provision of staff in such colleges, if necessary.
2. Before giving clearance to a college for starting a new class, the government may ensure by obtaining a certificate from the university to the effect that the management has fulfilled all the conditions of affiliation expected to be fulfilled by it.

In view of the above, the following steps may be taken to ensure enforcement of conditions of affiliation and thereby to improve standards in teacher education.

1. All the universities may prepare comprehensive conditions of affiliation for strict compliance in opening new institutions.
2. In order to improve standards in the permanently affiliated institutions, periodical inspection may be held to ensure continuous compliance of conditions of affiliation.
3. There is a need to create an agency at the national level for accreditation of teacher education institutions in the country. The accreditations should be based on national norms to be developed by the accrediting agency.

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Ph D. Theses Abstracts

A Study of the Characteristics of the Resource System and the Process of Developing and Communicating Innovation and their Impact on Adoption Process

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THE FOLLOWING were the main objectives of the study :

1. To study the characteristics of the various levels of educational resource systems.
2. To study the process of developing innovations at various levels of educational resource systems.
3. To study the process of communicating innovations at various levels of educational resource systems
4. To find out the relationship between the characteristics of the educational resource systems and the level of adoption of innovations.
5. To find out the relationship between the process of developing innovations and the level of adoption of innovation.
6. To find out the relationship between the process of communicating innovations and the level of adoption of innovations.

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Hypotheses

Based on the rationale, critical observations of the past studies and the objectives of the present study, three null-hypotheses were formulated. These are :

1. There is no relationship between the characteristics of the educational resource systems and the level of adoption of innovation.
2. There is no relationship between the process of developing innovation and the level of adoption of innovation.
3. There is no relationship between the process of communicating innovation from the educational resource systems and the level of adoption of innovation.

Experimental Design

The dependent variable under the study was the level adoption of innovations. The independent variables were the characteristics of the educational resource systems (CERS), process of developing innovation (PDI), and the process of communicating innovation (PCI)

Sample

In all, 95 educational resource systems of four types were selected on the basis of stratified random sample. It consisted of 10 educational resource systems at the national level, 12 state institutes of education, 3 regional colleges of education and 70 teacher training colleges and university departments of education.

Tools Employed

The following tools were used for the data collection : (i) a questionnaire, and (ii) a rating scale. Keeping the aims and objectives in view, the investigator constructed items with the help of relevant literature, research studies, newspaper articles, research articles, research reports, etc. Besides, he contacted a large number of educationists, educational administrators, directors of SIES, principals of teachers' training colleges, and heads of the various university departments of education, seeking their assistance in preparing the exhaustive list of items for the three questionnaires to study the characteristics of the educational

resource system, process of developing innovation and the process of communicating innovation. Thus, in all, 152 items were constructed. These items were placed before two language experts for their suggestions and modification. The investigator, on the basis of the suggestions, made a suitable modification in the structure of the items without disturbing its content ! The items were distributed in their respective questionnaires (CERS=54, PDI=60, and PCI=38). The draft of the questionnaire was tried out on five experts for their judgment about the inclusion of items in a particular dimension of the questionnaire. Closed-type responses were to be recorded against each statement in the space provided for the purpose. The first draft of the questionnaire was ready with 152 items in dimensions (CERS=7 dimensions, PDI=3 dimensions, and PCI=3 dimensions). The first draft of the questionnaire was administered on 15 teacher-educators to suggest improvement and enhance clarity. The final draft of the questionnaire consisted of 134 statements (CERS=45, PDI=53 and PCI=36).

A rating scale was constructed to record the judgment of the heads of the educational resource systems about the level of the adoption of the innovations which were developed in their institutions and communicated from them. The continuum hypothetically was thought to be of seven categories and each of the seven categories of the level of adoption was described in the rating scale. The draft of the rating scale was discussed with five experts for their judgment about the seven categories to determine the face validity of rating scale. Reliability of the rating scale was found out by test-retest method. The product moment correlation between the two scores for the rating scale was found to be 0.78.

Data Collection

The questionnaire, rating scale and identifying data sheet were mailed to the principals of the secondary teachers' training colleges, heads of the university departments of education, directors of the state institutes of education and the educational resource systems at national level and to the principals of the regional level educational resource system. Two reminders and second time follow-up questionnaires were mailed to the non-respondents. Some institutions were personally visited. As a result of this, the investigator could get complete data from 95 educational resource institutions.

Data Analysis

Mean percentage and rank order correlation were employed to analyse the data.

Results

1. The mean percentage scores of the national, state, regional and local level educational resource systems for their characteristics were 83.60, 76.88, 89.48 and 72.85, respectively. The mean percentage scores of the total educational resource systems on their characteristics was 75.03.

2. The mean percentage scores of the national, state, regional and local level educational resource systems on linkage factors were 86.33, 78.03, 91.10 and 72.46, respectively. The mean percentage score of total educational resource systems on linkage factor was 75.13.

3. The mean percentage scores of the national, state, regional, and local level educational resource systems on structure factor were 88.30, 84.16, 90.00 and 77.40, respectively. The mean percentage score of total educational resource systems was 80.20.

4. The mean percentage scores of the national, state, regional, and local level educational resource systems for openness factor were 88.57, 86.88, 90.45 and 80.60, respectively. The mean percentage score of total educational resource systems for openness factor was 82.54.

5. The mean percentage scores of national, state, regional, and local level educational resource systems for capacity factors were 88.80, 74.64, 96.00 and 73.20, respectively. The mean percentage score of the total educational resource systems on capacity factor was 75.72.

6. The mean percentage scores of the national, state, regional, and local level educational resource systems for reward factor were 78.80, 69.64, 84.00 and 69.90, respectively. The mean percentage of total educational resource systems for reward factor was 71.00.

7. The mean percentage scores of national, state, regional, and local level educational resource systems on proximity factor were 78.50, 73.75, 90.00 and 72.02, respectively. The mean percentage of the total educational resource systems on proximity factor was 73.50.

8. The mean percentage scores of the national, state, regional, and local level educational resource systems on synergy factor were 78.75, 70.82, 85.00 and 65.00, respectively. The mean percentage score of total educational resource systems on synergy factor was 68.00.

9. The level of adoption of innovation was found to be positively and significantly related to the characteristics of the educational resource systems.

10. The mean percentage scores of national, state, regional, and local level of educational resource systems on process of developing

innovation were 74.57, 76.44, 80.12 and 69.18, respectively. The mean percentage for the total educational resource systems was 71.01.

11. The mean percentage of scores of national, state, regional, and local levels of educational resource systems for awareness of innovations were 83.50, 85.00, 91.65 and 75.62, respectively. The mean percentage for the total educational resource systems was 78.15.

12. The mean percentage of scores of national, state, regional, and local levels of educational resource systems for sources of getting information about innovations were 69.90, 67.58, 80.66 and 62.68, respectively. The mean percentage score of the total educational resource systems was 64.63.

13. The mean percentage of scores of national, state, regional, and local levels of educational resource systems on shaping of innovations were 75.44, 80.80, 76.00 and 72.32 respectively. The mean percentage of the total educational resource systems was 73.83.

14. The process of developing innovation was found to be positively and significantly related to the level of adoption of innovation.

15. The mean percentage scores of the national, state, regional, and local levels of educational resource systems for the process of communicating innovation were 68.27, 59.81, 63.33 and 50.44, respectively. The mean percentage for the total educational resource systems was 53.91.

16. The mean percentage scores of the national, state, regional, and local levels of educational resource systems for one-way communication of innovation were 64.33, 58.61, 63.88 and 51.07, respectively. The mean percentage for the total educational resource systems was 53.82.

17. The mean percentage scores of national, state, regional, and local levels of educational resource systems for one-way feedback communication of innovations were 64.66, 59.85, 65.00 and 51.40, respectively. The mean percentage score for the total educational resource systems was 54.29.

18. The mean percentage scores of national, state, regional, and local levels of educational resource systems for two-way communication of innovations were 71.33, 60.97, 61.00 and 48.62, respectively. The mean percentage for the total educational resource systems was 52.95.

19. The process of communication of innovation from the educational resource systems was found to be positively and significantly related to level of adoption of innovations.



An Evaluation of Leadership In Educational Administration at District Level

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THE VARIABLE leadership has been studied in a number of disciplines and fields of knowledge. This pattern of behaviour characterizes all the administrators working in different organizations in different capacities. Hence, the studies on leadership have attracted the attention of the researchers in several fields such as sociology, psychology, industry, business management, education and political science. Researchers in these fields have studied the phenomenon of leadership as manifested in the behaviours of principals, teachers, students, politicians, executives, engineers, doctors, managers and other social groups. They have also studied the relationship of the leadership with a number of other correlates. Halpin studied the leadership behaviour of school superintendents and found that effective or desirable leadership behaviour could be characterized by high scores of both initiating structure and consideration. Mead concluded that desirable leadership behaviour for principal was characterized by high performance on the initiating structure and consideration dimensions measured by leadership behaviour description questionnaire. Kunz and Hoy studied that a principal strong on both dimensions had teachers with the broadest professional zone of acceptance. Sikes in his study found that consideration was the most important leader behaviour dimension affecting morale, as indicated by the comparative values on the morale factors. The superintendents, consideration behaviour was extremely important in the dimension. Galloway found in his study that there was a positive significant relationship between teacher perception of leader behaviour and teacher morale. Consideration was the best predictor of overall teacher morale. Initiation of the structure did not account for a significant amount of variance in teacher morale. The study by Cook revealed that higher

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mean morale scores were associated with perceptions of high levels of initiating structure and consideration. Walker found in a study that leader dimension 'consideration' was more highly correlated with morale than was the dimension 'initiating structure'. Earp in his study found that the participation in collaborative supervision caused significantly greater gains in cooperating teachers' positive attitudes to their jobs. Ainsworth studied that there was no significant difference between teachers' sex and teachers' perceptions of principals' leader behaviour. Sommers found that principals whose leader behaviour is high in consideration and initiating structure do have better teacher morale in their buildings. A male teacher had significantly higher morale. Gruenfeld and Kassum found that reported satisfaction with supervisor and quality of patient care were high only when rating of supervisor on an employee's consideration and initiation structure were both high. Reported organizational coordination was related only to rating of supervisor on initiating structure. It was concluded that both of supervisory style dimensions are important for effective supervision. Watson inferred that supervision was judged to be the most important single factor in determining an employee's morale. A group of women textile workers improved their morale through greater participation. A glance at the relevant literature suggests that no research seems to have been undertaken to study the phenomenon and the problem involved in the present study.

Objectives of the Study

The study in hand aims at achieving the following purposes:

1. To evaluate the existing educational leadership meaning thereby to identify the styles of leadership with regard to the dimensions of 'initiating structure' and 'consideration'. This will answer the question: Which of these styles is more characteristic of the educational leadership at the primary school level?
2. To probe into the relationship that might be existing between styles of educational leadership as measured in this study and teachers' morale.
3. To study the relationship that might be existing between styles of educational leadership and teachers' attitudes towards their job.
4. To study if there is any impact of sex on educational leadership. In other words it means to study the male and female percep-

tion of educational leadership at this level of education. A comparative study of the two is aimed at.

5. To study if there is any difference between rural-urban perception of educational leadership at this level of education.

Hypotheses

To achieve these foregoing objectives the following hypotheses were framed:

1. That educational leadership can be described in terms of the dimensions of the leadership scale and its individual items.
2. That the two styles of educational leadership differentially characterize the existing administrative leadership at district level.
3. That educational leadership at district level is not perceived alike in the girls' and boys' schools.
4. That educational leadership is not perceived alike in the schools located in urban areas and those located in rural areas.
5. That educational leadership in general influences teachers' morale.
6. That each of the dimensions of educational leadership, 'initiating structure' and 'consideration' is significantly related to teachers' morale.
7. That educational leadership in general influences teachers' attitudes towards their job.
8. That each of the two dimensions of educational leadership 'initiating structure' and 'consideration' is significantly related to teachers' attitudes towards their job.

The Population and the Sample

Population for the purpose of this study has been defined as the basic school teachers of Sitapur district. The district of Sitapur has five municipalities and 19 development blocks. It was found that there were about 5,000 teachers in the basic schools of all these blocks including the basic schools of the cities and the towns. The whole population of these teachers was stratified into boys-girls schools and rural-urban schools strata. The population in which teachers were found to be available was 2 : 3, both for urban-rural schools and girls-boys schools. It was decided to pick out a 10 per cent sample from the total population proportionately and stratum-wise. Thus, a sample of 500 teachers

was drawn from the total population of 5,000 basic school teachers in the manner described earlier.

Collection of the Data

The data for the present study were collected by using the following research tools constructed by the investigator himself :

1. Educational leadership behaviour questionnaire
2. Teachers' attitude scale
3. Teachers' morale scale

All these three tools were administered to the basic school teachers who formed the basis of this study.

Statistical Techniques Used

For testing various hypotheses Kolmogorov-Smirnov test of significance was used.

Findings of the Study

The study has finally emerged with the following findings:

1. The school teachers perceive the leadership in educational administration at district level to be positive and desirable. Ten items of the educational leadership behaviour description questionnaire (ELBDQ) received the highest mean scores. These items represent behaviour syndrome of democratic leadership. Most of the teachers are, perhaps, satisfied with the over-all leadership styles of behaviours of the administrators operating at district level.

2. The educational leadership can be measured in the same way as other traits of human personality and that it can be described in terms of certain characteristics as initiating structure and consideration. Thus leadership may be considered as consisting of two dimensions or styles such as 'initiating structure' and 'consideration'. The consideration style of leadership is more dominant in the administrative behaviour of the educational leaders at district level.

3. The educational leadership in general was perceived in the girls' school as more positive and desirable as compared to the boys' school. These two groups were further compared separately on 'initiating structure' and 'consideration' style of leadership. The girls'

school teachers as compared to the boys' school teachers perceived the existing leadership as adopting more of 'initiating structure' style of administration. Next to this, on 'consideration' style of leadership significant difference between them was not found. In other words, sex is found to be linked with the educational leadership in general when both the styles are put together and with the 'initiating structure' style of leadership but not with the 'consideration' style of leadership.

4. The rural and urban school teachers perceived alike the existing educational leadership in general. Next to this, 'initiating structure' and 'consideration' style of leadership were also perceived alike by these group of teachers. In other words, the rural-urban location of the school is not linked with the perception of educational leadership at district level.

5. The leadership characteristic of the educational administrator influences teachers' morale. The relationship is found to be positive. This means that high desirable leadership of the educational administrators generates higher morale in the teachers, while the low desirable leadership of the educational administrators causes low degree of morale.

6. The 'initiating structure' and 'consideration' dimensions of educational leadership also emerge, significantly, correlated with teachers' morale. A higher degree of morale was found to be present in the teachers who perceived high 'initiating structure' and high 'consideration' characteristics as more dominant in the behaviours of the district level educational administrators.

7. High desirable educational leadership leads the teacher to more positive attitudes towards their job as compared to low desirable educational leadership. This may mean, perhaps, that there is linear positive correlation between educational leadership and teachers' attitude towards their job.

8. The 'initiating structure' dimension of educational leadership also appears to be significantly related to teachers' attitude towards their job. The consideration dimension of leadership is not found to be related to teachers' attitudes towards their job.



Cost-Analysis of the University of Panjab : 1950-51 to 1974-75

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A PHENOMENA of rising money costs in higher education has drawn the attention of both planners and researchers. Besides, educationists are also conscious of rising costs of academic irrelevance in higher education. There are also suggestions for regulating admissions to higher education since proliferation of institutions of higher education has been unabated. The proper utilization of resources and money spent on institutions of higher education is essential not only because of it being public money but also for the efficiency in the system. It is, therefore, of utmost importance to analyse the cost-factor involved in the maintenance of the institutions of higher learning. The present case study of the Panjab University has, therefore, been an attempt of analysing cost-factor phenomena at micro-level.

Objectives of the Study

The objectives of the investigation were :

1. To examine trends of expenditure by its objects and with respect to the functions of the university
2. To analyse trends in the level, variation and subsidization of unit costs.
3. To examine the applicability of cost-functions in relation to the optimum use of the resource-inputs.
4. To determine the level of private costs by type of courses.

It is an ex-post cost analysis which investigates the economic and educational processes of internal organization of the Panjab University in

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general and teaching departments and affiliated colleges in particular which affect allocative efficiency of resource-inputs. The object is realized through times and cross-sectional study of both institutional costs and private costs.

General Trend in University Expenditure

The level and composition of the university expenditure was examined from 1952-53 to 1974-75. The level of institutional expenditure showed a rising trend. Recurrent expenditure increased by 10.04 per cent between 1952-53 and 1974-75 and capital expenditure at the rate of 1.77 per cent per annum. It was deduced from the trend that the university was dispensing off the over-riding effect of the so-called traditional functions as conducting of examinations and affiliating of colleges. A shift in allocation was seen in favour of teaching, municipal services, students' welfare functions of the university. The university was spending almost three-fourths on salaries and university examinations. The allocation pattern on these items got reversed over the observed period (per cent share on salaries increased and on examinations decreased). A study in shifts of priorities in expenditure by the university revealed that the university expenditure was affected mainly by (a) inflation, (b) displacement, and (c) development. The overall effect of the price level between 1962-1975 when measured from 1961 base (1960-61 = 100) deflated the recurrent expenditure by 38.77 per cent and the capital expenditure by 36.6 per cent. The university had to face rigours of displacement and reorganization as a result of (i) rehabilitation and reorganization of university colleges, centres and departments, (ii) transfer of affiliated colleges to other universities, and (iii) transfer of matriculation and higher secondary examinations to school boards.

The Cost Analysis of the University Teaching Departments

The cost-trends of 30 teaching departments were examined covering period through 1965-66 to 1974-75. These cost-trends were studied with respect to (a) absolute level of unit costs of these departments, both at current prices and at constant prices (1960-61 = 100), (b) growth-characteristics of various cost-determinants, (c) subsidization, and (d) cost-size relationship. Three types of growth-characteristics were identified in recurrent costs :

1. Recurrent costs had a positive growth rate with negative growth

- rate of students and positive growth rate of teachers. There were 11 departments covered by this phenomena
2. Unit costs increase also when there is positive growth in students as well as in teachers. Particularly it is more prominent when the growth rate in teachers is higher compared to growth rate in students. This phenomena was traceable in six departments
 3. The sharp decline in recurrent costs of some departments was characterized by the phenomena when growth rate in students was considerably higher causing fall in recurrent costs. There were 12 departments which were affected by this type of development. Variables like enrolments, number of full-time teachers and variation in unit-costs (real) did not show inconsistency in the departments of botany, chemistry, zoology, chemical engineering and technology, law, and English. The coefficient of variation for recurrent costs, students and teachers was below 20 per cent in these departments between 1965-66 and 1974-75. Contrary to this, departments of anthropology, bio-chemistry, education, history, political science and Sanskrit were relatively inconsistent in their internal organization. The coefficient of variation for students, and recurrent costs were found above 20 per cent in these departments.

The application of cost-functions, in general, reveals that enrolments and teachers are predominant variables in determining unit-costs of a particular department. The application of parabolic equation ($y=a+b_1x^1+b_2x^2$) and cubic equation ($y=a+b_1x^1+b_2x^2+b_3x^3$), revealed the presence or absence of economies of scale in a particular department. Departments of anthropology, bio-chemistry, chemistry, geology, mathematics, physics, pharmaceutical sciences, commerce and management, journalism, ancient history, culture and archaeology, history, geography, political science and Punjabi were found under-sized. These departments could expand enrolment. The departments of chemical engineering and technology, economics, sociology, English, Hindi and Sanskrit were over-sized and the options were open to the university to regulate admissions in these departments.

The subsidization of unit-costs in teaching departments from the public funds has increased over the years, except in a few departments. It was also noticed that the rate of subsidization of maintenance expen-

diture of hostels per resident increased from Rs. 0.33 in 1966-67 to Rs. 84.44 in 1974-75

Private Costs

The study also examined the private costs—costs of books, stationery, additional expenses of living in hostel and fee-payments by students to institutions both for teaching departments and affiliated colleges through a field-study. Students' questionnaire was developed for this purpose. The questionnaire also contained information regarding the family background of students—family income, members in the family, earning and dependent members, occupation of the guardian, etc. The level of hostel expenses per hosteller in teaching departments was Rs. 2,918 per session whereas for other costs it varied between Rs. 715 and Rs. 1,151. The level of hostel expenses in private colleges was more as compared to the government college. The level was Rs. 2,507 in private colleges and Rs. 2,212 in government colleges per session. Other private costs in private colleges ranged from Rs. 909 in Prep. arts to Rs. 1,300 in TDC commerce as compared to Rs. 530 and Rs. 745, respectively, in government colleges. For MA's the private costs (fees, books, stationery, transport) was Rs. 978, M.Sc. home science Rs. 859, B.Sc. engineering Rs. 712, architecture first degree Rs. 1,116, and B.Ed. Rs. 689.

Socio-economic Background of Students

In teaching departments 66 per cent belonged to the middle income group (per capita income of the household being Rs. 1,500-6,999 per annum); 9.71 per cent from low income group (per capita income of Rs. 1,000-1,499), 12.62 per cent from the rich income group (per capita income of Rs. 7,000 and above) and 11.65 per cent in the poor income (per capita income being below Rs. 1,000). The corresponding percentage for affiliated colleges was 46.6 per cent, 42.2 per cent, 4.6 per cent and 26.52 per cent, respectively. It was noticed that majority of the respondents declared that their father's occupation was administrative services followed by farming. Sex-wise distribution showed that amongst boys, majority come from the administrative service (57.9 per cent) followed by farming (27 per cent). Amongst girls, 46.3 per cent declared their guardian's occupation as administrative service, 32.5 per cent declared that they belonged to business class.

Implications of Findings and Suggestions : Teaching Departments

The pressure of development and adverse effect of displacement

brought financial stringencies on university. A university which had surplus revenue budgets in fifties, had to lean heavily on loans and development grants. Options were open to the university to rationalize its examination fees, hostel fees and price-policy for its publications which could improve its publications which could improve its resource-base. Again, for effecting economies of scale, some departments should expand their enrolments and others should reduce their enrolments as indicated earlier. For decision-making, the format of the university budget should be made comprehensive enough so that it could provide disaggregated data of expenditure and income. Since production-function of the university was a complex process and it related to phases like instruction, training, research, extension, general welfare activities, student welfare activities and most of such other activities which affect indirectly the academic function, hence costs data should reflect these dimensions of university production process. It is desired that some further research may be undertaken which could help in developing a theoretical frame on output budget approach of accounting. This approach lays emphasis upon threefold process of the system planning, programming and performance budgeting system.

Characteristics of Cost-analysis in Affiliated Colleges

The following aspects were covered under cost-analysis of the affiliated colleges:

- determination of the level of institutional costs in money and real terms and their level by type of colleges ;
- seeking explanation of variation in the level of expenditure over the period which had affected the pattern of unit-costs and examining functional relationship between various costs-determinants ;
- extent of subsidization of institutional costs ;
- economic viability of affiliated colleges and its educational implications.

Salaries determined largely the level of unit costs in affiliated colleges both in terms of magnitude and relative share. The following four economic aspects were found relevant in understanding the salary structure of teaching staff and their impact on unit costs of affiliated colleges :

1. The replacement of part-time teachers by regular teachers increased unit costs.

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2. The unit costs were affected by the variation in the salary structure of the teaching staff. Computation showed that in 1955-56, 95.13 per cent of teachers were drawing basic pay below Rs. 550 per month. This percentage got reduced to 76.44 per cent in 1973-74 which indicated an upward concentration in higher salary slabs.
3. Computation of median pay explained the rate of change in salary slabs from 1955-56 through 1973-74. The median basic pay of teachers teaching general courses moved up from Rs. 190 in 1955-56 to Rs. 375 in 1973-74, for professional education from Rs. 205 to Rs. 550
4. Growth rate of teachers both for general education and professional courses further brought impact on unit costs. Annual growth rate of teaching staff for general education was 7 per cent as compared to 9.5 per cent in professional courses. The growth of colleges has been very high between 1964-65 and 1969-70. This brought multiplier effect on enrolments, teachers and investments of expenditure in affiliated colleges.

Unit costs in affiliated colleges : Unit costs varied by type of education. The recurrent costs in general education (average of 53 arts and science colleges) was Rs. 566.25 in 1974-75. The corresponding recurrent costs in colleges of education was Rs. 734.72, home science Rs. 2,780, architecture Rs. 3,260, engineering Rs. 4,163.50, and medicine Rs. 12,302. The unit costs varied also due to number of faculties, organization of courses by level, management and location of colleges. Recurrent costs of private colleges were 47.53 per cent of the government colleges. The variation in recurring costs between private and government colleges was mainly due to the variation in salary component of recurrent costs. The level of salaries of staff in private colleges was less than half (43.88 per cent) of the government colleges. The proportion of other costs in private colleges was 62.2 per cent of the government colleges. Salaries as well as other costs in rural colleges was lower (Rs. 524.57) as compared to urban colleges (Rs. 598.20).

Subsidization of unit costs in affiliated colleges : Subsidization of unit costs was examined at two levels : (i) financial support to institutions by grants, and (ii) subsidies to students by provisions of scholarships, stipends, other financial assistance and free-tuitions. A cross-sectional examination of subsidization by type of education/institution revealed that in the first degree (arts) single faculty colleges subsidization was 37.84 per cent, in the first degree arts and science (multi-faculty)

colleges, 50.51 per cent in postgraduate colleges in 1974-75. Subsidization of recurrent costs in colleges of education was 34.97 per cent, in colleges of medicine 73.13 per cent, in colleges of home science 75.14 per cent, in colleges of engineering 86.46 per cent and colleges of architecture 91.26 per cent. It was further revealed that the subsidization of recurrent costs was higher in government colleges, 91.7 per cent of government colleges were found subsidizing recurrent costs above 60 per cent as compared to 41.46 per cent in private colleges. Again, the subsidization scale was higher in rural colleges as compared to urban colleges. 65.2 per cent of the rural colleges were subsidizing recurrent costs above 60 per cent. The corresponding percentage in case of urban colleges was 43.3 per cent. Investigation further showed that recipients of subsidies to the total enrolment were 9.7 per cent at the minimum level (1959-60) and 24.4 per cent at the maximum level (1962-63).

Economic viability versus educational viability of affiliated colleges : The Education Commission (1966) recommended a minimum size of 500 students for economic viability and an optimum size of 1,000 students for educational efficiency in affiliated colleges. The University Grants Commission has also fixed up criteria of a minimum enrolment and teaching staff for grants. If we go by the norms of UGC for minimum enrolment of 400 students then there were 23 non-viable out of 46 colleges in this university in 1974-75. Calculations showed that a college requires at least 8 years to become viable with total enrolment of 400 students (excluding pre-university).

Analysis revealed that non-viable colleges were from the mofussil areas. These were almost single faculty arts colleges and could not muster 400 enrolments even of their standing of 8-10 years. These colleges showed poor educational efficiency, low pass percentage, high drop-outs, poor infrastructure, high dependency ratio of prep students.

Under these circumstances, norms of grants-in-aid should be modified taking into consideration the realities. A proper weight should be given for educational variable—student-teacher ratio, age factor, management, size, proportion of fresh students to the strength of students, demographic character of the locality of the college, level of physical infrastructure (laboratory-library facilities) and quality aspect of education.

The pattern of grants-in-aid should be devised in such a way that it promotes stimulation, strengthens the base and encourages innovative practices in education. The four-tier system of grants appeared to be a feasible alternative approach which is :

1. *Minimum need-based grants :* These grants should be directly

related to unit costs. Here unit costs should be treated 'operating cost per student'. These operating costs should be equally divided into three main agencies : (a) student or household, (b) management, and (c) state governments

2. *Development grants* : The state government should come forward to provide development grants for necessary infrastructure. The UGC could give a floor-support of seed capital. But major responsibility should be of the state government.
3. *Special incentive grants* : These grants should be given for innovative ideas, experiments, standard performance in university examinations and improvement in institutional efficiency. Certain institutions which are engaged in the cultivation of achievement should be rewarded.
4. Special grants for colleges located in the educationally backward areas.

Subsidization of unit cost should be linked with manpower needs of the economy (allocative efficiency of resource-inputs) of both of individual household and the state. It should also satisfy equity principle. The equity principle demands that those who are not in a position to afford costs of higher education and have an aptitude for a particular course should have an opportunity of completing the course through financial support from the public funds. The study recommends feasibility surveys which should integrate aspects of manpower needs, regional development and economic viability for college mapping at modal points so that clustering of colleges is made a feasible proposition from the standpoint of economics of education. A curriculum with an appropriate base of rural technology could be developed and in single arts faculty colleges a parallel vocational stream could be introduced. This type of approach could reduce the cost of academic irrelevance.



*A Study of the Outstanding Problems of Teachers of Standards
V-VII of the Marathi Language Side of Municipal Primary
School of Greater Bombay*

SATYAPRADHA DESA

SOcially, politically and economically the world is changing with a dramatic speed. With the changing world, there is reconstruction of education at all levels. The role of the teacher has changed. It has become extremely broad and complex. The teacher can no longer be the old school master from whom pupils receive orders and knowledge. It is being realized that knowledge is unending and that it cannot be stored. So children who are being prepared for adult life and adult responsibilities need to be given training and skills quite different from those which sufficed their parents. Schools aim at an all-round development of individuals through curricular and co-curricular activities. However, for promotion of all these educational ideals, the performance of the teacher is the key element. So by degrees, the role of the teacher has gone beyond the percolation of knowledge.

It is necessary, therefore, for the teacher to have skills of class organization and management as well as knowledge of successful teaching techniques and the subject-matter. These demands of the teacher raise many problems. There are the physical demands of the job in time and energy. Moreover, teachers have their own needs, aspirations, interests and family commitments. In view of the manifold responsibilities of the teachers, the present study was undertaken to find out exactly what their problems were and what difficulties teachers had to face in their jobs.

Objectives of the Study

1. To obtain data on demographic and family background of teachers.

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2. To obtain data on domestic, social, economic, health, transport, accommodation and other living conditions of the teachers with a view of finding out if they had any problems on personal side and whether in their opinion, the problems affected them mentally or physically and affected their class teaching.
3. To obtain data about teachers, on classroom situation, availability and use of teaching aids, educational guidance, teaching preparation, with the objective of finding out whether these were the problem areas for teachers, and if so, whether in their opinion they affected them and their class teaching.
4. To obtain information about teachers with respect to the attendance of children, homework, language spoken at home, reading facilities and other academic help available to children at home and in school with the objective to finding out whether these were the problem areas for teachers and whether, in their opinion, they affected the teachers and their classroom teaching.
5. To obtain information on the parents, understanding of the needs of their children attending municipal primary schools.
6. To assess the attitudes of teachers to the background of children who attended municipal primary schools.
7. To throw light on all problems of teachers and to find out the extent and magnitude with which they affected teachers and class teaching on priority basis.
8. To suggest guidelines for formulating a minimum programme of redressing grievances of teachers and thereby achieving maximum utilization of municipal resources for the educational growth of children of Greater Bombay.

Research Hypotheses

To fulfil the objectives outlined, the following research hypotheses were formulated:

1. The main problem of municipal primary teachers was the educational apathy of homes of children (and problems arising out of that) attending municipal primary schools.
2. Comparatively, least problems of municipal primary teachers were personal and domestic problems.

3. There was no difference between problems of city teachers and suburban teachers.
4. There was no difference between problems of men teachers and women teachers.
5. There was no difference between problems of trained graduates and SSC/PTC teachers (sample of 100 teachers)
6. There was no effect of length of teaching service on problems of teachers (sample of 100 teachers).
7. There was no effect of size of families of teachers on their problems (sample of 100 teachers).
8. There was no difference between attitudes of men teachers and women teachers towards children attending municipal primary schools.

Procedure

The present research study was confined to teachers of municipal primary schools of Greater Bombay. So the following procedures were adopted for data collection - (a) visit to schools and observation, (b) interviews of teachers and head teachers, and (c) preparation of a questionnaire consisting of three separate parts as under:

1. Part I put forth 20 problem areas of teachers. Each problem area was given independent status and treatment. The topic of each problem area was mentioned at the top and questions belonging to that problem area written below it. Each problem area had a key question which was assigned key role in that problem area. After discussion regarding details of the problem area was over by means of component questions, the key question was asked to measure the extent of the problem and to find out if the problem affected the teacher and/or classroom teaching. The number of questions in each problem varied from problem to problem depending upon its magnitude.
2. Twenty problem areas of Part I were listed out one below the other in Part II and the teachers of the study were asked to rank them from one to twenty taking into consideration the intensity and seriousness with which each one affected them.
3. Part III was an attitude questionnaire specially prepared for the present study to assess the attitudes of teachers. It presented problematic situations which occur in the day-to-day

life of the school. Teachers were expected to mark their responses to the statements of the questionnaire. The attitude questionnaire was not a test or a grouping of borrowed items. Except for an item or two, entirely new items were devised by the researcher for the purposes of the present study

These three parts of the questionnaire were prepared with great care and caution after study of relevant literature on the subject and after discussion with colleagues and experts in the field of test construction. The three draft questionnaires were later tried out and suitable modifications were made in the final form on the basis of personal interviews and the experience of pilot testing.

Tabulation and Analysis of Data

A three-fold analysis was done for the analysis of data of the three parts of the questionnaire as follows :

- i. For analysis of data in Part I of the questionnaire, analysis tables were prepared. (a) areawise, i.e. for city suburbs and combined for city and suburbs, (b) sexwise, i.e. analysis tables were prepared separately for men teachers and women teachers, (c) agewise, i.e. all 900 teachers of the study were divided into three age-groups—(i) below thirty years, (ii) between 31-45 years and (iii) over 45 years—(d) marital status-wise—all 900 teachers were divided into three groups : (i) married, (ii) unmarried and (iii) widowed/divorced. Thus nine types of analysis tables were prepared and data were analysed accordingly.
2. Analysis of data in Part II of the questionnaire was done areawise and sexwise. Analysis tables for Part II differed greatly from those of Part I because in Part II, all 900 teachers gave 20 ranks to 20 problems of Part I of the questionnaire.
3. Part III was an attitude questionnaire. Scores were assigned to right/wrong answers. Answer-keys were prepared in consultation with teachers, supervisors and experts in the field of test construction. Scores obtained by 900 teachers were given statistical treatment wherein mean, standard deviation and so on, worked out.

4. Information of ten different types about teachers of the study like age, sex, marital status, family background, etc. was given by teachers at the beginning of the questionnaires. Analysis tables were prepared for collecting these demographic details of teachers and data were analysed accordingly.

The data so analysed were interpreted by using (a) percentages, (b) null-hypothesis (CR), and (c) rank correlation coefficient (ρ).

Conclusions

1. The main problem of municipal primary teachers was the educational apathy of homes of children (and problems arising out of that) attending municipal primary schools (hypothesis 1).
2. Comparatively least problems of municipal primary teachers were personal and domestic problems (hypothesis 2)
3. Problems of classroom situation, teaching aids, use of class library and educational guidance were rank six to rank ten problems of teachers.
4. The problem of transport was rank two problem of all teachers.
5. The problem of accommodation and economic problem were rank two and rank three problems, respectively, of men teachers.
6. The problem of looking after one's own children was rank five problem of women teachers.
7. Nearly 60 per cent teachers admitted that they did not like the teaching profession but they were in it because of exigencies of circumstances. Thus, in brief, it could be said that the problems of teachers had (i) no relationship with area of teaching school (hypothesis), (ii) significant relationship with (a) sex, (b) educational background, (c) tenure of service, and (d) family size (hypotheses 4, 5, 6, 7).
8. All teachers of the study (areawise and sexwise) had positive attitude towards children attending municipal primary schools and their home conditions.
9. There was no difference in the attitudes of (a) men teachers and women teachers (hypothesis 8) and (b) city teachers and suburban teachers.
10. Problems of teachers of the study were genuine because the

ranks given by the teachers to their problems in Part II were commensurate with the discussion on problems by the teachers in Part I of the study.

The study included suggestions based on conclusions pertaining to each of 20 problem areas of teachers and topics for further research in the field.



A Study of Some Cognitive and Socio-Emotional Variables in Socio-Economically Disadvantaged Children

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THIS STUDY subscribes to the 'difference' rather than 'deficit' model in the study of disadvantaged children. Most of the researches that have been conducted in the area of social class differences, so far, have been influenced mainly by the 'deficit' approach which states that the socio-economically disadvantaged suffer from multiple cognitive, linguistic and personality deficits which tend to interfere with their school achievement and learning. As an outcome of these researches several compensatory educational programmes have been evolved over the years for the disadvantaged children. But these have somehow not met with adequate success. One of the reasons given by some researchers for these programmes not succeeding is that they tend to emphasize the disadvantaged child's weaknesses and deficiencies and do not take cognizance of their positive attributes. These researchers believe that if educationists and teachers want results they must concentrate on developing learning power in these children and for this it is imperative that

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they understand the strengths, the coping abilities and positives of these children so as to institute a well-rounded, strength-based educational strategy for them.

The present study was planned in conformity with this view and was undertaken with the main objective of exploring and identifying some cognitive and socio-emotional strengths of the socio-economically disadvantaged children which could pave the way for a more relevant educational programme for them. With this objective in mind an experimental design was followed whereby the experimental group, i.e. the disadvantaged sample was studied in comparison to two control groups, i.e. the middle SES group and the high SES group. The criteria for demarcation of the three socio-economic groups was father's occupation and education. On the basis of this criteria a total sample of 300 children was selected from Class V. The specific variables investigated in the study and their measures are as follows :

<i>Variables</i>	<i>Tools</i>
1 Field Dependence	Story Pictorial Embedded Figure Test
2 Modality Preference	Digit Span Test
3 Creativity	Torrance's Test of Thinking Creatively with Pictures
4. Cooperation	Maximizing Difference Game
5 Delay of Gratification	Mischel's Questionnaire Method
6. Dependency	Dependency Test

Intelligence was included as an intervening variable and measured by Cattell's culture fair intelligence test (scale 2).

Hypotheses

Based on the theoretical framework of social learning theory of development as well as relevant research evidences available, the following research hypotheses were formulated :

- 1.1 The disadvantaged boys and girls will be more field-dependent than their counterparts in the advantaged groups of middle and high socio-economic classes, respectively.
- 1.2 Boys will be more field-independent than girls in each of the respective socio-economic groups.

- 2.1 The disadvantaged boys and girls will demonstrate a stronger preference for visual modality in comparison to their counterparts in the advantaged groups of middle and high socio-economic classes respectively.
- 2.2 There will be no sex differences in each of the respective socio-economic groups in visual modality preference
- 3.1 The disadvantaged boys and girls will be more creative than their counterparts in the advantaged groups of middle and high socio-economic classes, respectively, on measures of the four dimensions of creativity—fluency, flexibility, originality and elaboration.
- 3.2 Boys will be more creative than girls in each of the respective socio-economic groups on measures of the four dimensions of creativity—fluency, flexibility, originality and elaboration.
- 4.1 The disadvantaged boys and girls will be more cooperative than their counterparts in the advantaged groups of middle and high socio-economic classes respectively.
- 4.2 Boys will demonstrate less degree of cooperation than girls in each of the respective socio-economic groups.
- 5.1 The disadvantaged boys and girls will show less dependency than their counterparts in the advantaged groups of middle and high socio-economic classes respectively.
- 5.2 Boys will show less dependency than girls in each of the respective socio-economic groups
- 6.1 The disadvantaged boys and girls will demonstrate less ability to delay gratification as compared to their counterparts in the advantaged groups of middle and high socio-economic classes respectively.
- 6.2 There will be no sex differences in ability to delay gratification in each of the respective socio-economic groups.

Hypotheses 1.1 to 3.2 were examined under two conditions separately : (i) with effects of intelligence not controlled, and (ii) with effects of intelligence statistically controlled since these hypotheses pertained to variable which had a cognitive component in them. The data obtained on these variables was subjected to a 2×3 univariate analysis of variance and covariance with intelligence being the single covariate. Data on delay of gratification was subjected to non-parametric chi-square analysis.

Conclusions

The main conclusions that emerged from the results obtained are the following :

1. The disadvantaged low SES sample was found to be significantly more field-dependent than the middle and high SES groups. This finding has the following implications for the education of these children : (a) The teaching methods to be used with these children should be conducive to their field-dependent cognitive style (b) Due to their field-dependent cognitive style the disadvantaged children would tend to be more attentive to social rather than non-social stimuli. This preference and selective attention for social cues should be capitalized upon in the drawing up to the curriculum, preparation of textbooks and in classroom interactions in schools catering to disadvantaged children. (c) By virtue of their field-dependent cognitive style the disadvantaged would also tend to require externally defined rather than self-defined goals and reinforcements and would also be more affected by, and sensitive to, criticism. In the classroom situation, therefore, a generous use of external reinforcements (in the form of rewards or verbal praise) and constructive criticism would pave the way for better learning for these children (d) In the learning situation these children would need relatively more explicit and structured instruction in problem-solving strategies, more clearly organized materials for learning and more exact definitions of performance outcomes. For the teaching of concepts they would favour a spectator approach as against a hypothesis-testing approach.

2. The disadvantaged sample demonstrated a stronger preference for visual modality as against the aural modality in comparison to the high SES group. The preference demonstrated by them was stronger than that of the middle class too, but the difference was not significant. This modality preference of the disadvantaged also has implications for their education, especially for the teaching of reading. On the basis of this finding it is stressed that teachers should lay greater emphasis on the word method, sentence method and story rather than restricting themselves to the alphabet method or phonetic method in the teaching of reading. They should also make much more extensive use of visual aids, charts and drawings to ensure more efficient learning. This stress on visual stimulation should not, however, be confined only to reading but to the teaching of all subjects in the primary grades.

3. The low SES group did not differ significantly from the middle class on the four dimensions of creativity. In comparison with the high SES group, however, while the disadvantaged group was significantly in-

ferior on three dimensions, there were no differences on fluency which has been considered by some researchers to be the most valid index of creativity. This is an important observation. The fact that the disadvantaged group was found to be as creative as their counterparts in the middle SES group is also significant. It is recommended that teachers in these schools, which cater only to the middle and low SES children, should be made aware of this so that they can give due recognition and reinforcement to this potential and view the disadvantaged children from a more favourable and positive stance.

4. The disadvantaged children, though not different from the middle class, were significantly more cooperative and less competitive than the high SES group. It consequently follows that a shift should be made in their schools from the existing competitive system, which may be workable in the public schools, to a more group-oriented cooperative system which would better match their cooperative disposition. Strategies like 'learning through teaching' group projects and activities are suggested as viable alternatives.

5. The disadvantaged children were as dependent or alternatively independent, as the middle and high SES groups. This contradicts the generally prevailing belief among the teachers that these children are very dependent by nature and cannot be expected to take initiative or work on their own. It is observed that the authoritarian atmosphere of most of these schools may be the very cause of the dependency acts that are observable among these children in the classroom. The fact that they are no more dependent than their more advantaged peers indicates that strategies like cooperative learning and open schools which require a great deal of self-monitoring of activities and self-reliance can be tried out with these children with a fair degree of confidence.

6. The disadvantaged low SES sample did not demonstrate less ability to delay gratification as compared to the middle and high SES groups. On the contrary, the trend, though not significant, indicates a greater tendency to defer gratification among the low SES as compared to the higher SES groups. This lends credence to the fact that delay of gratification is a situation-specific phenomenon and is determined by a number of situational variables like expectancies of success, perceived value of the reward, role models, etc. Consequently when translated into the school situation, the same children reportedly demonstrated less ability to defer gratification for academic goals since their expectancies for attaining these goals, as well as the perceived value of education for them, are very low. The fact that they do not opt for immediate gratification in a generalized way in all situations holds out hope that given

certain salient and valued stimuli in the academic setting these children could defer gratification, too, by working towards the set goals.

But, in the larger perspective, the problems lies more in the economic structure of our country. Unless education holds out promise of some form of economic protection to these sections of our society, the motivation to defer gratification for educational goals will continue to be very low among these disadvantaged children. □

Research Notes

A Correlational Study of Risk-taking and Creativity with Special Reference to Sex Differences

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GAMBLING in one form or another has existed in all societies and at all levels of civilization, all of us are gamblers on one or the other occasion. And yet throughout history man has constantly tried to control uncertainty and to reduce risks. Major advances in human progress have been achieved through minor reductions in risk. The blending of persons into 'tribes', the discoveries of fire, the domestication of animals, the inventions of science and the evolution of agriculture have all been means of reducing risks. In modern times also the emergence of social security and the welfare states may be regarded as reflection of man's desire to introduce greater certainty into man's life, and to make his days less risky. If the element of risks is eliminated from human life, each type of progress and development might come to an end.

Thinking process is the core of risk-taking and decision-making process. Thinking emerges from doubts, perplexities and uncertainties. Likewise risk-taking is also a state of uncertainty. There are two types of thinking—convergent and divergent. The convergent thinking abilities are those which are mainly responsible for a

dealing with given information in a logical manner to arrive at a single right answer for any problem. On the contrary the divergent thinking abilities enable the individual to go off in many different directions, generating new information and arriving at varied original and unusual solutions to the problems. There is no denying the fact that both types of thinking abilities are highly correlated with uncertainty and risk-taking. But comparatively divergent thinking and the so-called creativity is highly related to risk-taking.

Review of published work in the domain of creativity reveals that risk-taking and adventurousness is an essential personality characteristics of a creative person. Torrance (1968) described 84 personality characteristics. But the most important ones are as follows : accepts disorder, adventurous, strong affection, awareness of others, feeling of humour, attempts difficult jobs, not hostile, and willing to take risk. Stein and Henize suggested the following personality characteristics of creative individuals : independence of judgement, less authoritarian, accepts own impulses, risk-taker, tolerates and acceptstaking chances, psychological safety and psychological freedom. Raina also stated that a creative person is ready to take risks. He is not at all worried about opposition and criticism, even persecution.

Getzel and Jackson (1962) have referred to willingness of creative adolescents to free themselves from customary mode of thought in order to pursue a new direction, i.e. to risk the uncertainty of the unknown. Bruner (1960) has described the child's need to free of risking error in order to make the occasional 'intuitive leap' Merrifield, Guildford, Christensen and Frick (1961) have reported a significant relation between associational fluency factor and personality inventory measures of risk-taking and tolerance of ambiguity. Kalpan (1963) in realm of scientific creativity has spoken of the role of self-confidence and risk-taking in fostering creativity of a research scientist in an organizational setting. Barron (1963) attributes risk-taking both to the creative person and to the creative act. Pankove and Kogan (1968) also reported a significant relationship between the number of associates generated to creativity tasks and preferred level of risk. McClelland (1963) has proposed that strong achievement motivation in creative scientist promotes the taking of calculated risks essential to scientific discovery.

All the above-mentioned studies emphasize the role of risk-taking in developing creativity. During the course of thinking, risk-taking focussed on tolerance of error and is a part of the fabric of creative thoughts. With such a perspective creativity can indeed be equated with cognitive risk-taking. These results have also been proved empirically.

For example, in layman's language risk-taking simply meant to take decision in an uncertain situation on a lower probability of success while facing danger. Similarly, creativity can also be regarded as a process of decision-making. When a man faces a dilemma he takes risky decision. If his decision regarding a problem is unusual, original, and uncommon he is thought to be a creative thinker as well as a risk-taker. Nevertheless, a novel and original solution of a problem cannot be accepted by a common man unless he has some courage.

In a fast developing country like India there is a great need of fostering creativity and identifying creative personnel for solving many complex problems in all spheres of life. Thus if we want to foster creativity we have to foster risk-taking attitudes at first.

Indian researchers have shown much interest in creativity. They tried to study creativity with reference to age, sex, adjustments, frustration, socio-economic status, self-concept, birth order and some other personality characteristics but the relationship between creativity and risk-taking has not been studied in India up to now. Hence the investigators thought it worthwhile to take up a project on the relationship of creativity and risk-taking.

Method

Selection of the Sample

A sample of 100 boys and 100 girls (graduates of Agra University) were tested for the purpose. But 82 boys and 81 girls were selected for final analysis because some questionnaire forms were not properly filled up by the students and the follow-up of these students was not possible.

Selection of Tools

For measuring creativity Mehdi's verbal test of creative thinking was used. It measured creativity in terms of fluency, flexibility, and originality and has an accepted degree of reliability and validity. For measuring risk-taking, a risk-taking inventory developed by Saroj Agarwal was used. This inventory has been developed on the lines of risk-taking inventory constructed by Jackson, Larry Hourany and Vidmar (1972), University of Western Ontario. The inventory measures four types of risks such as monetary, social, physical and ethical. There are three sub-tests in the inventory: (i) *self rating*—16-item scale, four

items for each type of risk, (ii) *situational dilemma*—this questionnaire consists of 12 (three for each risk) semi-projective type hypothetical situations although they depict real-life occurrences. The items of the test require a decision to be made between two courses of actions, and (iii) *personality inventory*—this inventory consists of 40 statements of true-false type (10 statements for each type of risks).

Reliability and validity of the inventory was determined by item-internal consistency method. Every item of the every risk-taking dimension has been correlated with total test scores of each type of risk. The value of correlation ranges from .28 to .82.

Results

Results obtained are shown in Tables 1, 2, and 3. Table 1 reveals the following facts :

TABLE 1
SIGNIFICANCE OF CORRELATION BETWEEN
RISK-TAKING AND CREATIVITY

<i>Relationship between</i>	<i>Sex</i>	<i>Number</i>	<i>Value of 'r'</i>	<i>Remark</i>
Creativity and risk	Boys	82	.45	Significant at .01 level
	Girls	81	.29	"
Creativity and monetary risk	Boys	82	.17	Not significant
	Girls	81	.15	"
Creativity and social risk	Boys	82	.35	Significant at .01 level
	Girls	81	.21	"
Creativity and ethical risk	Boys	82	.29	"
	Girls	81	.19	Not significant
Creativity and physical risk	Boys	82	.21	Significant at .05 level
	Girls	81	.15	Not significant

1. Both the correlation between creativity and the risk taken were significant at .01 level of the confidence. The correlations reveal the facts that increasing of creativity scores very much depend upon increasing or decreasing of scores on risk-taking and vice versa.

2. The value of correlations between creativity and monetary risk were positive but insignificant for both the sexes. Thus a positive rela-

tionship between creativity and monetary risk-taking at the appropriate age and circumstances cannot be ruled out

3. The results show that boys have a significant positive relationship in physical risk-taking and creativity while girls have insignificant but positive relationship. This low relationship in case of girls is but natural because usually the girls do not take physical risk while boys are comparatively more adventurous and risk-taking in physical matters.

4. In case of social risk and creativity the coefficient of correlations were found to be positive and statistically significant in both the cases. It means it is acceptable to think of creativity as a factor dependent upon social risks. This result can be verified and supported by the studies made by Torrance (1964) in which he determined the characteristic features of creative personality. He finds that more creative boys do not fear being thought differently. They always feel that whole parade is out of the step. Thus they want to change the society and its rules. They disturb the organization of society and take more social adventures.

5. In case of ethical risk and creativity the correlation was positive and significant in case of girls. It can be said that Indian girls are more religious-minded and more under the control of their parents and, therefore, they are not ready to take ethical risk, though the positive relationship of about .19 indicates the changing minds among the girls.

All these correlations have given a positive relationship between total risk-taking and different categories of risk-taking and creativity. This implies that with creativity, risk-taking also increases.

TABLE 2
SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS OF
RISK-TAKING OF BOYS AND GIRLS

Type	Sex	No	Mean	S D.	C.R.	Remark
Total risk	Boys	82	246.40	20.80	3.02	Significant at .01 level
	Girls	81	236.50	20.90		
Monetary risk	Boys	82	24.13	6.09	1.76	Not significant
	Girls	81	22.51	5.70		
Physical risk	Boys	82	29.17	5.61	5.71	Significant at .01 level
	Girls	81	25.40	2.10		
Social risk	Boys	82	26.95	4.86	4.82	Significant at .001 level
	Girls	81	24.62	4.62		
Ethical risk	Boys	82	20.10	5.82	2.41	Significant at .05 level
	Girls	81	18.22	5.48		

Table 2 reveals that the sex differences were found to be highly significant specially in case of total risk, social, physical and ethical risk. The finding is very realistic one. As a general observation it may be said that boys in comparison to girls are more independent in taking decision about their future. They think themselves more or less free from social and ethical bindings. They are more physically sound than girls. Hence they take more risk in every sphere of life.

TABLE 3
SEX DIFFERENCES IN CREATIVITY

Sex	No.	Mean	SE	CR	Remark
Boys	82	148.70	20.80	.98	Not significant
Girls	81	145.50	20.90		

Table 3 shows that there exists no significant difference between the creativity scores of two sexes. Hence the objective is not verified. It may be pointed out that at graduate level of education in most of the institutions the system of education is more or less similar and a large number of girls go to co-educational institutions. Hence there is no wonder if the differences in creativity like differences in intelligence are not related to sex.

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Sociological Problems in Tribal Education A Case Study

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SOCIAL FACTORS play an important role in the successful implementation of educational programmes for any society, more so for a tribal society. Superstitions and rigidity of tribal parents, traditional way of living, too much belief in evil spirits are hurdles in early schooling of tribal children. There are also instances of barriers, taboos and prejudices against formal education in many tribal societies. It is feared of the educated tribal boys and girls loosing their mooring and being caste adrift without any goal. These social barriers, fears and complexes create hurdles in the schooling of tribal children. So it was thought necessary to survey these problems and overcome it for a sound early schooling of tribal children.

Mirzapur, a district of Uttar Pradesh, was selected for the study as more than two lakhs tribal population comprising of Kol, Bhil, Baiga, Gond, Kharwar and others inhabit in the four main blocks, that is Duddhi, Babhani Muirpur and Ghorawal. Apart from this the tribals of adjoining

ality as a consequence of prolonged deprivation might function as greater emotional, cultural, social or economic blocks rather than when the deprivation existed for a shorter period. Any way, 'how much?' and 'how long?' concept of deprivation would have its significant impact upon the academic attainment

Prolonged deprivation is a multi-dimensional psycho-social construct embracing a wide range of environmental and organismic variables constituting the basic source of experiences to the living organisms. It refers to a dispossession or loss of privileges, opportunities, material goods, and the like, relatively for a longer period in its natural setting or insufficient satisfaction of basic needs for a prolonged period (New Comb 1970, Legmeir 1968, Tripathi and Misra 1972, Misra and Tripathi 1977). Researches on new dimensions of prolonged deprivation as independent variables affecting other psychological constructs would certainly add to the stock of knowledge on 'prolonged deprivation'

The emotional deprivation in the childhood as a consequence of either ineffective socialization process or disorganized social setting, broken homes, socio-culturally disadvantaged environments may seriously affect the academic performance of pupils, thereby obstructing and interfering the very process of mental growth. In view of this, prolonged deprivation could be considered as a significant inhibitory factor in the acquisition and assimilation of learning experiences. But which of the component of prolonged deprivation is the most inhibitory and which one is the least? Could it be possible to identify their relative impact as inhibitory components of prolonged deprivation? More specifically, attempt would be made to establish relationship between academic performance and some revealing components of prolonged deprivation.

Hypothesis

All the components of prolonged deprivation (Misra and Tripathi 1977) would show inverse relationship with academic performance,

Method

Sample

One hundred and sixty freshers at the college level equally divided into two sexes between age 17 to 20 years constituted the sample for this study. Purposive sampling technique for drawing out pupils from three colleges of Agra city,

Instrumentation

For measuring the prolonged deprivation, the prolonged deprivation scale (PDS)* of Misra and Tripathi (1977) was employed. It is a five-point scale consisting of 96 items covering 15 dimensions of prolonged deprivation. The indices of reliability and validity of the PDS are pretty high which ensure its high dependability as well as truthfulness. The average academic performance of two internal and one external examinations constituted the criterion for the academic performance of each pupil.

Procedure

In this study, prolonged deprivation (PD) is the independent variable whereas academic performance is the dependent variable. The PDS was administered to all the pupils under identical conditions in a convenient group of not more than 40 pupils. The personal data and the academic records of each subject was obtained in one testing session of two hours.

Results

Table 1 indicates that distribution of both variables are nearly normal, hence Pearson product moment correlation (r) may be employed successfully in order to understand the relationships between the two variables in question.

TABLE 1
STATISTICAL VALUES ON PROLONGED DEPRIVATION
AND ACADEMIC PERFORMANCE

<i>Variables</i>	<i>N</i>	<i>M</i>	<i>Med.</i>	<i>SD</i>	<i>Sk</i>
Prolonged deprivation	160	216.50	216.50	34.14	.18
Academic performance	160	264.00	262.50	38.63	.11

*This scale is published and available with the National Psychological Corporation, Agra.

TABLE 2

RELATIONSHIP BETWEEN ACADEMIC PERFORMANCE AND
VARIOUS COMPONENTS OF PROLONGED DEPRIVATION

<i>r between</i>	<i>Academic performance</i>	<i>Inference df 158</i>
Global prolonged deprivation	— .31	P < .01
Housing conditions	— .18	P < .05
Home environment	— .34	P < .01
Economic sufficiency	— .21	P < .01
Food intake	— .20	P < .01
Clothing practice	— .29	P < .01
Formal educational experiences	— .17	P < .05
Childhood experiences	+ .15	P < .05
Rearing experiences	+ .22	P < .01
Parental characteristics	— .15	P < .05
Interaction with parents	+ .16	P < .05
Motivational experiences	+ .22	P < .01
Emotional experiences	— .37	P < .01
Religious experiences	— .18	P < .05
Travel and recreation	— .07	Insignificant
Miscellaneous quasi-cultural experiences	+ .16	P < .05

Discussion

A close inspection of Table 2 reveals that except a few reversals, there is a general trend of negative correlation between the prolonged deprivation (PD) and academic performance (AP); which means that with the increase in the prolonged deprivation or in some of its dimensions, there is a corresponding decrease in the academic performance of the pupils. It is evident from this result that PD seriously affects the AP and there exists an inverse relationship between these two variables. On a global view-point, this result supports our hypothesis and the same is retained except in case of five components — childhood experiences, rearing experiences, interaction with parents, motivational experiences and quasi-cultural experiences, where positive relationship exists with AP.

Some of the revealing components of PD significantly related to AP are emotional experiences, clothing experiences, home environment, global prolonged deprivation, economic sufficiency, and food intake. Consequently, their effects upon the learning process and ultimately upon the learning experiences are crippling. These components put the children into most disadvantaged conditions: the affects of which have a prolonged effect upon the children's mental growth and academic

performance. Undoubtedly, the emotional detachment or withdrawal of parental affect, the family impact, the home conditions, the poverty and economic dependence, and the food and clothing deficiency influence the cognitive development and feeling components of the children, which ultimately inversely affect the academic performance of the pupils. Care has, therefore, to be taken to make every provision for eradicating these basic components of prolonged deprivation so that a deep-seated feeling of deprivation affecting the developmental process of the children may not take place. Besides these, some less remarkable ($P < .05$) components are religious experiences, parental characteristics, housing conditions and formal educational experiences.

An insightful analysis of the components effecting differentially the academic performance made it clear that parental characteristic is one of the sub-components of either interaction with the parents ($-.15$) or the emotional experiences ($-.37$). Whether the influence upon academic performance is positive or negative, it is the nature and kind of parents whose interaction may help or hinder the academic growth. Thus the parental characteristics may be positive traits helping the child's academic growth or negative traits interfering the scholastic performance. Another factor 'housing conditions' ($-.18$) could be treated to have been heavily loaded with physical traits of environment whereas 'home environment' ($-.34$) may be considered as a component having greater loadings of socio-emotional traits of environment. However, the housing condition ($-.18$) has not been estimated to be greater inhibitory component than the 'food intake' ($-.20$) and clothing practice ($-.29$). The religious experiences ($-.18$) which in fact could be considered to be sub-components of cultural deprivation have been found to have slight effect on the academic performance. Perhaps, language deficiency at home or poor language environment in neighbourhood, as a potential component of cultural deprivation might have revealed greater impact upon academic performance since the entire learning process and the acquired learning outcomes are primarily the products of effective language learning system learned right from the infancy to adolescence either at home or in school through either socialization process or social learning or schooling. Unfortunately, the rps did not include language deprivation as an aspect of cultural deprivation.

Positive indices of correlation have been estimated between academic performance and motivational experiences ($+.22$), rearing experience ($+.22$), quasi-cultural experiences ($+.16$), interaction with parents ($+.16$), and childhood experiences ($+.15$). It is obvious that motivational strength and effective rearing experience equip the children with positive

traits of personality which may self-actualize them to put their hard labour into operation. Cultivation of competitive spirit, effective study habits, sustained energy feedback and display of higher ego strength are some of the criteria of higher achievement motivation; and these factors, if inherent in the motivational experiences, facilitate to score higher in academic deliberations also. Obviously, as the data reveals, the motivational component of the PDS provided corresponding increase with the increase in the scores on academic performance. The results obtained on rearing experiences, childhood experiences and interaction with parents, all of which could be considered to be the sub-components of 'social deprivation', can also be interpreted in the like manner. The crucial point that we could record here is that the scores on each of these components of prolonged social deprivation have shown a corresponding increase with the increase in the scores on academic performance, the consequence of which is a positive correlation. These results, therefore, point out that the subjects under study did not feel that the level of prolonged social deprivation may inversely affect their academic performance. In fact, the positive relationship on some of the dimensions of prolonged social deprivation is a sufficient supportive condition of social life which might have interacted as facilitative factors in the academic developmental career of the children.

Conclusion

On the strength of the above results, we partially retain our hypothesis, and conclude that out of 15 components of prolonged deprivation as included in the PDS, ten have interfered whereas five have facilitated the academic performance of pupils. On the strength of the results obtained, and our discussion we conclude that :

1. Prolonged deprivation in general has been found to have a negative correlation with academic performance
2. Prolonged emotional, economic and some of social deprivation have been found as basic determinants of academic performance. More specifically, emotional interactions, clothing experiences, home environment, economic deficiency and food intake have been found to have a crippling effect upon the academic performance and, therefore, these five components should be considered as 'primary dimensions' of prolonged deprivation adversely affecting the academic performance beyond .01 level of confidence. In symbolic terms, this could be

presented as : $Ap = f(E, C, H, E, F_1)$, where Ap =Academic performance, E =Emotional interaction, C =Clothing experience, H =Home environment, E =Economic deficiency and F =Food intake.

3. Religious experiences, perental characteristics, housing conditions and formal educational experiences could be considered as 'secondary' dimensions of prolonged deprivation adversely affecting the academic performance only to the extent of .05 level of confidence.
4. Motivational experiences, rearing experiences, interaction with parents and quasi-cultural experiences have indicated facilitative effect upon the academic performance, the coefficients of correlation being all positive. The former three components showing positive relationship are socio-emotional dimensions deprivation. The positive relationship indicated the corresponding increase in scores on these components of PDS with the increase in academic performance. In reality, therefore, these components facilitated the academic performance of pupils under study. The level of deprivation on these dimension is, therefore, not inhibitory but supportive ones.
5. On relative consideration, the academic performance is adversely affected to a greater extent by prolonged emotional and economic dimensions rather than socio-cultural ones.
6. Language deficiency as a component of prolonged cultural deprivation might have proved to be most potent determinant of academic performance. Unfortunately this component could not be studied for want of its omission from PDS.

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Sex Differences in Creativity in India : A Second Look

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MANU, the great law-giver of ancient India remarked : "She should do nothing independently even in her own house. In childhood subject to her father, in youth to her husband and when her husband is dead to her sons; she should never enjoy independence". A Hindu woman is given the opportunity to realize than express herself; she is traditionally considered as the adjunct of man and very seldom rebel against being so. Again, the son is considered more important than the daughter because *Punnam na narka travate tat putra*—the son is one who rescues a man from hell. Only a man's own son can perform the funeral rites necessary for salvation. Women are required to be shy, eternally patient, modest and meek, always ready to obey and suffer. In short, as Milton (1958) said : "He for God only, she for God in him". Surrounded by such cultural constraints and restrictions it is understandable that females could not have their self-actualization or realize their creative potentialities.

But one of the important events in the recent history of South-East

Asia has been the defeat of colonialism and more particularly the liberation of India from the British imperialism. After independence in 1947 the people of this country adopted a democratic constitution and with it the ideas of freedom and equality are gaining ground very rapidly. Now women enjoy equal rights and opportunities with men. Though the ideals of democracy and freedom are influencing people gradually, they are seeping into the consciousness of younger boys and girls very quickly.

The Problem

The author was, therefore, motivated to see whether or not after the adoption of a democratic constitution some twenty-five years back and the changed theoretical emphasis on progressive value-systems, there has been any impact on the measured creative thinking abilities of boys and girls in India. More specifically, an attempt was made to present evidence related to the following questions :

1. What is the difference, if any, in the measured creative thinking abilities of boys and girls on verbal and non-verbal tests of creative thinking on the dimensions of fluency, flexibility and originality ?
2. Is there an over-all difference in the creativity scores of boys and girls in India ?
3. What are the broad implications of the results arrived at in this study ?

Previous Research

The evidence of research regarding the differences between the sexes on creative thinking is not conclusive and one cannot discern a consistent trend of the phenomenon in one or the other direction. Crutchfield (1962) found males less conforming than females, Guilford (1964) reported that boys obtain higher mean scores on tests of semantic flexibility, on the other hand, girls tend to obtain higher means on tests of three fluency factors. From 1958 through 1960's the boys in the United States consistently excelled girls in most measures of originality but girls excelled boys in ability to elaborate in most measures of creative thinking (Torrance 1962, 1965, Torrance and Allottic 1969). In India, however, boys excelled girls on originality and verbal measures of the same tests (Torrance 1967, Raina 1969). As against this several studies (Check 1960, Kaltsounis 1971, Philips and Torrance 1971) show

that sex differences in measured creative thinking abilities have begun to fade out. Raina (1971) found no sex differences in creative functioning in Indian teachers except that male teachers scored significantly higher on the originality dimension of the non-verbal tests used by him. Again, Torrance (1972) found no sex differences in fluency, flexibility, inventive level, originality, intelligence and achievement. The only statistically significant difference was for elaboration in favour of women. Does this evidence of an absence of sex differences in creative thinking abilities suggest a change in the social attitudes regarding girls in the United States and in India also ?

Procedure

One hundred and ten Class IX science students (68 males and 42 females) drawn from three progressive Hindi medium higher secondary schools of Ajmer, India, participated in the study. The mean age of the boys and girls was 13.80 and 13.77 years, respectively. There was no statistically significant difference in the ages of the two sexes. The subjects, by and large, hailed from a middle-class socio-economic status.

Both the verbal and non-verbal forms of the Torrance tests of creative thinking were administered to the subjects. The verbal form consisted of product improvement test and unusual uses : the non-verbal tests comprised of figure completion test and the circles test. The tests were scored for the following variables : fluency (number of relevant responses), flexibility (varieties of categories of responses) and originality (statistical infrequency of the responses in this culture, relevance and creative strength of the responses). A total creativity score for both the tests was derived by summing all the sub-total scores. The tests were scored according to Yamamoto's (1964) procedure.

Inter-scorer reliability reported by Pathak (1962) based upon 32 protocols scored by two experienced scorers ranged from .82 to .94. Raina (1969) also found encouraging reliabilities for the figural form on the first year college students of the Regional College of Education, Ajmer. Several validity studies involving children have been reported and are summarized in the norms-technical manual for the tests (Torrance 1969).

Jalota's test of mental ability (1960), a widely used measure of intelligence in the northern states of this country and an achievement test in general science developed by Sanghi (1973) were also administered to the subjects of this study.

Results

The means, standard deviations and *t*-ratios of the differences in means of boys and girls on the measure of verbal creativity, intelligence and achievement in general science are presented in Table 1. It is obvious that there are no sex differences in fluency, flexibility, originality and the total creativity scores, intelligence and achievement in

TABLE 1
MEANS, STANDARD DEVIATIONS AND T-RATIOS ON VERBAL
FORM OF TORRANCE TESTS OF CREATIVE THINKING,
INTELLIGENCE, AND ACHIEVEMENT VARIABLES OF
BOYS AND GIRLS

<i>Scores</i>	<i>Boys (N=68)</i>		<i>Girls (N=4.)</i>		<i>t-ratio</i>
	<i>Mean</i>	<i>S.D.</i>	<i>Mean</i>	<i>S.D.</i>	
Fluency	42.26	9.53	44.91	8.95	-1.47
Flexibility	30.03	7.45	31.38	8.55	-0.35
Originality	57.72	14.03	62.62	14.63	-1.73
Total	130.18	29.70	139.12	30.87	-1.53
Intelligence	132.00	27.35	134.99	26.79	-0.11
Achievement	62.80	10.70	62.10	11.70	-0.13

general science. None of the *t*-ratios is significant at 5 per cent level. However, one fact that needs attention is that the overall differences in all the dimensions are in favour of girls. In the dimension of originality the *t*-ratio of 1.73, in favour of girls almost approaches the required level of significance set up in this study, viz. 5 per cent. And it may have its own significance.

Data regarding the performance of subjects on the figural (non-verbal) form are presented in Table 2. Again, the boys fail to establish

TABLE 2
MEANS, STANDARD DEVIATIONS AND T-RATIOS ON FIGURAL
FORMS OF TORRANCE TESTS OF CREATIVE THINKING

<i>Scores</i>	<i>Boys (N=68)</i>		<i>Girls (N=42)</i>		<i>t-Ratio</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
Fluency	30.72	6.55	29.78	7.86	0.65
Flexibility	22.53	5.24	24.14	5.09	-1.59
Originality	74.50	17.32	71.95	20.47	0.67
Total	127.83	27.00	124.83	33.62	0.54

their superiority over the girls in the dimensions of figural fluency, flexibility, originality and the total creativity scores. Though the differences are statistically insignificant, the boys, nevertheless, have an edge over the girls in the originality dimension while the girls are a shade better than the boys on the flexibility dimension.

Discussion

The evidence provided above leads to the conclusion that there are no differences in the measured creative thinking abilities of boys and girls who constituted the subjects of this study. The reason for this lack of any difference in this important area is difficult to speculate. The extent to which the measured creative abilities have changed since the adoption of the democratic constitution, more particularly since 1960 when the constitution took roots firmly, cannot be positively or definitively answered because no firm reference data exists. The result of this study, however, contradicts the findings of an early study by Raina (1969). Incidentally his sample also came from the same area—Ajmer—where the present study had been conducted, though his sample was comparatively larger (Boys $N=90$, Girls $N=90$) and in the age-group of 13 to 15, with classes ranging VIII through X. Raina explained the phenomenon of boys scoring higher on some of the dimensions of Torrance tests of creative thinking to "cultural blocks to creativity" (Torrance 1965). But any student of contemporary sociology in India cannot but be struck by the great changes that are taking place in social, economic and political fields in this country. Raina and Rama (1971) observed earlier, "But times have changed . . . The recent strikes and violences against teachers on the university, college and school campuses, the burning of material property by the youth point to a severe conflict between tradition and modernity in India". It may be recognized that there is nothing like cultural immobility or inertia and India is undergoing a rapid cultural transformation—there is a talk of women liberation movements also. India is in fact entering a new stage in the development of culture and "the stage of development of a culture obviously influences the means available to the individual for creative progress" (Stein 1967). Perhaps, some such thing is responsible that accounts for the results arrived at in this study.

The results of this study are presented with an amount of extreme caution only because of the small number of subjects who belonged to only three schools. It is suggested that the changes in measured creative

thinking abilities may be studied in developing countries that are undergoing a radical cultural change and even acculturation

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Sex and Regional Differences in Mathematical Creativity

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A VARIETY of forces are responsible for great demand in educational research on creative talent. The goal of education in terms of increased capabilities, personal expression, greater inventiveness and blossoming of the gifted cannot be fully realized in the absence of adequate knowledge of creativity. Understanding creativity is important in education programming, especially in mathematics where many students encounter difficulties.

Jensen (1973) defines mathematical creativity operationally as the ability to give numerous and applicable responses when presented with mathematical situation in written, graphic or chart form. Hohn (1961) regards the study of patterns, relationships, forms, structure in system of numbers, geometric figures, functions and other objects of interest as the primary creative activity of mathematicians and thus important in identification of potential creative ability in mathematics. Invention is the discerning choice. The most fertile combinations come from disparate fields, and many of these may be sterile, they rarely occur to the inventor. The power to differentiate harmonious, fertile and

beautiful combinations from others' sterile combinations differentiate creative and non-creative mathematician. Creative work in mathematics requires intuition, imagination, experimentation, judicious guessing, grouping, divination, insight, immense patience, continuous involvement in thinking, sudden illumination and sense of achievement. Creativity in mathematics requires willingness to give up or add some axioms. It requires relaxation or addition of some conditions of theorem and seeing how far conclusions are modified. Mathematical creativity expresses itself in generating new significant concepts, generalizing a number of concepts or theorems, establishing link between obviously unconnected concepts and theorems, and establishing relations among facts of mathematics and facts of nature and society. The human mind seems to take least from the outside world, in which it acts or seems to act only of itself and on itself in mathematical creation.

The relationships between creativity and sex as well as between creativity and socio-economic and cultural milieus have been very important to understand nature, nurture and utilization of creativity. The reliability and validity of data collected from various studies are so sketchy that there is a need to carry on research with rigour. Strauss and Strauss (1968) making a wider cross-cultural study observed sex differences in American and Indian populations. In both the societies boys were significantly more creative than girls. They further explored that the gaps were wider in Indian than American student populations.

Ogletree (1968) studied a big sample of 1,165 sixth grade girls and boys from England, Scotland and Germany, and observed that English and German girls were significantly high on both verbal and non-verbal creativity measures; the Scotland girls were not significantly high than boys though their mean on figural creativity was high. Ward and Cox (1974), Hussain and Hussain (1975) did not find significant sex difference with respect either to creativity in total or most of the creative abilities. Kogan (1974) reviewing literature on significance of sex role on creativity confirmed that no clear picture can be drawn of sex role in creativity.

The children of economically advantaged home have been found more creative than those of economically disadvantaged homes (Kunz and Moyer 1969). Hussain and Sahay (1975) reported that the tribals were equally creative as their urban counterparts. Sharma (1972) observed that rural Ss were more creative than their urban counterparts. Thus, it becomes imperative that the nature of mathematical creativity be explored with respect to sex and regional variables. The study was

entitled 'sex and regional differences in mathematical creativity'. The hypotheses examined were :

1. Significant sex difference exists with respect to mathematical creativity.
2. Significant level of development of a regional difference exists with respect to mathematical creativity.

The various concepts were operationally defined :

1. Mathematical creativity was operationally defined as the composite score of fluency, flexibility and originality as measured by CAMT (Balka 1974) and adopted for local use in Hindi (Tuli 1981)
2. The fluency of thinking was operationally defined as the ability to call up ideas where the quantity and not quality of ideas is emphasized. The measure of fluency was the fluency score obtained by the subject on CAMT.
3. The flexibility of thinking was operationally defined as the ability to produce a diversity of ideas of categories in a situation that is relatively unstructured. Its measure was the flexibility score on CAMT.
4. The originality was operationally defined as the ability to produce remotely associated or uncommon responses. Its measure was the originality on the CAMT.
5. The level of development of a district is based on average value of productivity for each district.

Methodology

The survey method was considered useful as it enabled to gather data from a relatively large number of cases at a time and collect detailed descriptions of existing phenomena. The sample was selected by employing technique of multi-stage randomization of cluster at the district, block, school and levels from Class IX high/higher secondary schools of the Punjab State. Grewal and Rangt (1977) have divided the districts of Punjab into four categories. The four clusters of districts in the State of Punjab are :

- | | |
|--|----------------------|
| 1. Bhatinda, Hoshiarpur,
Ropar and Faridkot | More under-developed |
|--|----------------------|

- | | |
|---|-------------------------------------|
| 2. Sangrur and Ferozpur | Under-developed |
| 3. Patiala, Gurdaspur,
Amritsar and Kapurthala | Average level of development |
| 4. Ludhiana and Jullundur | Above-average level of development. |

Each district has three clusters of blocks, i.e. developed, average developed and under-developed blocks. One district was selected from each of the more under-developed and above-average developed districts randomly. The under-developed block was selected from the more under-developed district whereas the developed block was selected from the above-average developed district to investigate discernible regional differences.

One school at the block headquarter for boys and one for girls were randomly selected from the block to be representative of the population. However, a co-educational school had to be selected where only single school existed at the block headquarter.

The research tools administered for collection as assessment data were 'creative ability in mathematics test' in Hindi. The creative ability mathematics test (CAMT) was developed and validated by Balka (1974). Its reliability coefficient was $r_{xx} = 0.72$. The standard error of measurement for the CAMT was 7.2386. The validity of the CAMT as a measure of creative ability in mathematics was determined by using the factor analysis. The creative ability in mathematics test was translated into Hindi and adopted for population (boys and girls) of Class IX (Tuli 1981). The CAMT generates scores, fluency, flexibility and creative ability in mathematics (fluency+flexibility+originality).

Statistical Design and Analysis

The *t*-test was used to determine significant difference of prevalence of mathematical creativity in the population. The groups were matched with respect of sex (boy and girls) and region (above-average developed district (AADD) and developed block (DB); and more under-developed district (MUDD) and under-developed block (UDB).

The Table presents prevalence of mathematical creativity in the population. Table A, B, C and D show means of creative ability of fluency, flexibility, originality and CAMT.

TABLE
MATHEMATICAL CREATIVITY
A. FLUENCY

Criterion	N	Mean	SD	MD	SEm	t
Boys	172	7.69	3.56	1.86	.32	5.81**
Girls	132	5.83	3.55			
AADD/DB	78	5.43	2.54	-1.25	.53	2.36*
MUDD/UDB	37	6.68	2.69			

B. FLEXIBILITY

Boys	172	7.54	3.60	1.81	.40	4.53**
Girls	132	5.73	3.32			
AADD/DB	78	5.20	2.23	-1.37	.84	2.85**
MUDD/UDB	37	6.57	2.52			

C. ORIGINALITY

Boys	172	1.62	1.6178	.74	.17	4.53**
Girls	132	.88	1.16			
AADD/DB	78	1.04	1.03	.52	.18	2.88**
MUDD/UDB	37	.52	.86			

D. CREATIVE ABILITY IN MATHEMATICS

Boys	172	16.78	8.28	4.33	.92	4.71**
Girls	132	12.45	7.68			
AADD/DB	78	11.68	5.36	-2.08	1.09	1.90
MUDD/UDB	37	13.76	5.53			

*significant at .05 level of significance

**significant at .01 level of significance

Findings

It was found that means of mathematical creativity—fluency, flexibility, originality and composite score of fluency, flexibility and originality ($F+X+O$) for boys are significantly greater than that of girls. It is significant at .01 level of significance. The conclusion arrived at is that boys are significantly more creative than girls in mathematics. The study confirms the findings of Strauss and Strauss (1968), whereas it refutes the findings of others that the girls are more creative than boys or there is no significant sex differences with respect to creativity. Therefore, the hypothesis 'significant sex differences exist with respect to mathematical creativity' is confirmed.

The means of mathematical creativity—fluency, flexibility, originality and CAMT—reflect differential trends with respect to the above-average developed district and the developed block and the more under-developed district and the under-developed block.

The mean scores of creative ability of fluency, flexibility in mathematics for MUDD/UDB are higher than that of AADD/DB. It is significant at .05 level of significance for fluency and at .01 level of significance for flexibility. However, the creative ability of originality represents a reverse trend. It is higher and significant at .01 level of significance for AADD/DB than that of MUDD/UDB. There is no significance difference in means of AADD/DB and MUDD/UDB with respect to composite score of creative abilities in mathematics. Therefore, no clear picture of level of development of the region and mathematical creativity in Class IX has emerged.

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A Sample Study of the High School Drop-outs in Rural Western Orissa

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OUR CONSTITUTION swears to give eight years of free compulsory education to all. Paradoxically only 23 per cent of the children in the age-group 11-14 are in schools in Orissa. This is largely a case of attrition. As good as 93.96 per cent drop out before completing matriculation. Things are going from bad to worse in the cases of tribal Harijan and backward regions of the State. Thus, the problem of the drop-outs is contradictory to the national goals, and merits immediate attention.

The most important characteristics of drop-outs revealed in research studies are : (a) negative attitude towards school, (b) inability to achieve a modicum of success in academic work, (c) irregular attendance, (d) lack of motivation or interest in learning (Barbe 1967). Some other important reasons for leaving the school are scoring low in intelligence test (Brody and Brody 1976), "his (drop-out's) poverty, the lack of corrective action taken in his home, his inability with IQ tests, the slow manner in which he works on academic problems, his insecurity and fear of failures" (Groff 1964). In addition to that some of the Indian findings which are of greater relevance speak that economic backwardness is a primary cause for dropping out (Sharma and Sapra 1969, Masavi 1971, Khandekar 1974, Sable 1977). Others are illiteracy of parents, aimlessness of the candidate, ignoring parent's opinion, low educational aspiration (Khandekar 1974), attendance in school, pupil's academic performance, interest in education, motivation for learning from home, parents' view of child's educational performance (Sharma and Sapra 1969), untrained and inefficient teachers, unsuitable curriculum and medium of instruction (Mahendra 1972). Another interesting finding is that the incidence of wastage and stagnation occurring among students belonging to SC, ST and other castes are equal, rather at times the percentage of wastage and stagnation is more among other castes than STs and SCs (Vyas and Chaudhury). The parents of the drop-outs are usually drop-outs, as are his elder brothers and sisters. Queerly, indeed, a drop-out leaves school due to lack of interest but wants a certificate for job (Schreiber 1967). He also lacks self-reliance (Rohrer).

Objectives

The objectives of the study were :

1. To identify the factors determining tribal and non-tribal wastage in general.
2. To know the socio-economic and academic problems of the drop-outs.
3. To know the attitude of the drop-outs towards school, school subjects and teachers and its effect on school achievement.
4. To know whether low intelligence is one of the factors according to drop-outs.

Sample and Delimitation

The sample comprised only 10 drop-outs belonging to different castes and socio-economic levels of the Western Orissa. This was a small

sample for socio-educational study, none-the-less it was representative of the rural Western Orissa and was suitable for a sample study preceding to a full-fledged indepth study which is under progress. In this study the investigator could not conduct personal interview with the fathers and guardians of the drop-outs. Half of the sample were 25 years of age or above to know the post-drop-out life of the drop-outs.

Tools and Techniques Used

1. The basic interview guide prepared by Sable (1977) was adapted keeping in view the prevailing local conditions of the rural areas of the Balangir and Sambalpur districts, supplemented by an additional schedule prepared by the author to assess the special problems of the tribal drop-outs.

2. The Raven's standard progressive matrices was used to know the intelligence level of the respondents.

3. The average marks of the two preceding annual examinations (and test examination in the cases of those who left after the test before leaving the school) was used to know the drop-outs' school achievement.

Findings

The study revealed that (i) the incidence of drop-out is high in the exit classes, where the students have to face an external examination. The whole sample had dropped out either in Class X or in Class XI. (ii) The educational aspirations of the drop-outs were based more on their ability to pay than on their ability to do good at school. (iii) The two equally important reasons for dropping out were : (a) failure in class examination or low academic performance and financial hazards or poverty of the drop-out. (b) More tribals drop out due to poverty than due to their non-tribal counterpart. Other reasons were : (c) lack of self-confidence, (d) joining the family trade or business, and (e) conflict with parents and taking vocational training. (iv) Intelligence was found to be a factor accounting to drop-out. (v) It was sad to note that half of the drop-outs were the eldest siblings, who, in turn, are more likely to multiply the problem than remedy it. (vi) A slight less than half of the drop-outs dropped on their own will. (vii) More tribals than non-tribals felt unhappy to drop out but could not do away with it. (viii) Only 20 per cent of the drop-outs were in secured services, other being underemployed or unemployed in their post-drop-out life. (ix) The average time devoted by the drop-outs to home task was reported to

be three and half-hours. However, only 10 per cent could secure a pass mark in examinations. (x) All the drop-outs had liking for the school and school subjects. They liked the teacher who taught well in the class and 'Oriya', the mother tongue as a school subject was liked by most of them. (xi) The drop-outs had strong faith in hard work and intelligence as the reasons for improvement in life. (xii) The father was found to be the dividing member of the family in planning and executing the education of the child. But so far as vocation is concerned, the candidate's own role was more important. (xiii) All the drop-outs had positive attitude towards education. (xiv) Drop-outs' parents were either illiterate or low educated. They were engaged in low socio-economic occupations. (xv) Exposure to mass-media was limited in case of the drop-outs and most of them had little religious habit. (xvi) Financial assistance to the tribal drop-outs was insufficient.

Discussion

The most important reason for dropping out is low academic achievement which very often leads to failure in class examination, and ultimately results in dropping-out. The secondary reasons revealed in this study, like joining traditional trade or business, taking vocational training and lacking self-confidence are only the follow-up steps to and prestigious terms for failure in class examination. However, findings (No. ix, x and xi) speak that the drop-outs used to devote three and half hours daily, had liking for the school subjects and teachers, and had faith in hard work. This indicates that there is little or no correlation between likes and class performance. Drop-outs liked the subjects, as it appears, not for their intrinsic value. The negative relation between hard work and academic achievement in the study is, perhaps, due to the low level of intelligence of the drop-outs. None of the sample has gone beyond the range of intellectually average under which fall only four out of ten cases. Three each out of ten fell under definitely below average and intellectually defective. A striking difference emerges between the intellectually average tribals and non-tribals. Three times the non-tribal drop-outs are better up intellectually than the tribals. Another vital reason for dropping out is the low economic status of the family. The disguised educational expenditure like fees, fines, purchasing of study materials and uniforms, hostel and boarding charges, etc. stand generally on the way of the poor students and it is more a burden for the repeaters.

A lone case of the sample provided an interesting background. He

dropped out due to emotional and adjustment difficulty with his father and the step-mother. This is related with the question of interaction with parents, teachers and peers. This study re-establishes Sable's (1977) finding that lack of interaction with parents is one of the reasons for dropping out in Orissa at the secondary stage. Half of the sample which had daily conversation with their parents received no substantial help other than the encouraging words to do better in examination. Of course 80 per cent of fathers were handicapped, because they themselves were either completely illiterate or had very low education. The drop-outs rated the role of the father and their own to be the most important in planning and executing their education followed by the headmaster, the class teacher and the friend. But in the field of vocation they rated their own role to be the most important followed by father, mother, friend, class teacher and headmaster, respectively.

Negative attitude is accepted to be the primary reason for dropping out among the American youth. However, the present sample indicated a positive attitude towards education. They considered education as an instrument of advancement in life. Eight out of ten cases did not agree with the statements 'educated young men do not respect elders' and 'educated young men forget our own culture'. They rejected all other negative statements. Some other positive statements like 'you have too much fun', 'you should spend more time studying', and 'if you can study well, you can improve in life', which frequently came from their parents, had also positive attitude towards education. The analysis of a statement indicated instrumental attitude of 10 per cent of the sample. But unlike Sable's finding the sample was not fundamentally instrumental. The sample was not against the existing education pattern, curriculum, teachers and teaching in general. No difference was found concerning the interaction with parents, and attitude towards school, school subjects and teachers between the tribal and non-tribal drop-outs.

However, these findings are simply symbolic. Many of the threads of this discussion need to be examined critically. The full-fledged in-depth study which is under progress may reveal many strange facts.

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Book Reviews

Who Gets Ahead?

Who Gets Ahead? The Determinant of Economic Success in America

CHRISTOPHER JENCKS, SUSAN BARTLETT, MARY CORCORAN, JAMES CROUSE, DAVID EAGLEFIELD, GREGORY JACKSON, KENT MCCLELLAND, PETER MUESER, MICHAEL OLNICK, JOSEPH SCHWARTZ, SHERRY WARD AND JILL WILLIAMS. Basic, New York, 1979, pp. 397. Price: \$ 17.50

WHILE James Coleman found that 'schools make no difference and families do make' (*Equality of educational opportunity* by J. S. Coleman *et al.*, Washington D.C., US Government Printing Press, 1966), Christopher Jencks demolished further the then thinking with his startling finding that 'nothing but luck makes any difference' (*Inequality: A reassessment of the effect of family and schooling in America* by C. Jencks *et al.*, New York, Basic, 1972). Until now Jencks' revolutionary finding could not be further substantiated by empirical evidence, nor could it be seriously challenged, not to speak of demolition. Here comes Jencks himself once again with another team of colleagues to re-examine, if not to challenge, his own earlier findings. The present study concluded, contrary to the finding of his earlier study, that "those who do well economically typically owe almost half of their occupational advantage and 55 and 85 per cent of their earning advantage to family background" (p. 81).

At the outset, it may be interesting to note how the present study originated. Jencks' earlier study relied on 'what seemed to be the best evidence available at the time'. Jencks realized that "Analysing the distribution of status or income as if it were nothing more than the product of innumerable individual decisions taken in a historical and cultural vacuum (as was done in *Inequality*), is at best risky and at worst

obscured." "A realistic analysis", Jencks further observes, "of economic inequality also requires historical data on the extent to which changes in the distribution of personal characteristics have actually been associated with changes in the distribution of status and earnings in various societies" (p 311). As such data are hard to find, *Who Gets Ahead?* also suffers unfortunately from the same fundamental flaw. However, Jencks also realized that there were 'a number of potentially serious gaps' in *Inequality* and immediately initiated 'a systematic effort to close some of these gaps' and the result is *Who Gets Ahead?* However, the authors claim rightly that it is a very different book from *Inequality*.

The present study concludes that family background exerts a substantial influence on economic outcomes: About 48 per cent of the variance in occupational status and 15-35 per cent of the variance in annual earning is explained by family background. It may be noted that this is as strong an association as that between education and economic success. Further, the study found that non-cognitive measures explained atleast as much of the variance in men's status and earnings as test scores did, and finally that the best readily observable predictor of a young man's eventual status on earning is the amount of schooling he has had. These conclusions are obviously different from what the earlier study concluded. But if we look at the details the findings seem to be *not completely* different. For instance, the earlier study concluded that family background explained 15-20 per cent of the variance in incomes, but the present study concluded it to be in the range of 15-35 per cent. Similarly, according to the former, schooling explained 42 per cent of the time variance in occupational status and 12 per cent in incomes, and the corresponding estimates of the present study are 55 and 20 per cent. Thus *Who Gets Ahead?* does not altogether demolish the conclusions and findings of *Inequality*. But every conclusion of the earlier study has been qualified and some times partly reversed. In other words, while in the former study the authors emphasized the empty half of the glass, in the present study the other half of the glass is focussed.

While both studies attempted to provide explanation to similar questions such as relationship between schooling, cognitive abilities, personality traits, family background, race, occupational status and economic achievement, there are striking differences in several respects. The present study is based on a broader range of data sources—five national and six special-purpose surveys of 25-64 year old men in the US. More serious efforts are made in the present study to find out the cause-and-effect relationship between several variables. Accordingly,

relatively more rigorous methodology has been adopted and the result is : It would be of interest to relatively more professional readers. And finally, while the earlier study was written collectively by a team and the major, if not the whole, responsibility was taken by Jencks, the present study consists of 12 chapters, each written individually by different authors, even though Jencks made an impressive effort to synthesize the various results. As the different authors used different surveys for their data, for many crucial parameters, we have, not one but a range of estimates. (Thanks to Jencks and his eleven associates, the reader finally is not wholly confused!)

The study opens with an introductory chapter which gives a brief description of the surveys and the statistical methods. Chapter 2 presents a detailed description of the method adopted. The next four chapters present the empirical findings regarding the effects of family background (Chapter 3), academic abilities (Chapter 4), non-cognitive traits (Chapter 5) and education (Chapter 6) on occupational status and earnings. The racial disaggregation is made in Chapter 7 and the effects of family background and education on the earnings are compared between whites and non-whites. Chapter 8 summarizes the empirical findings of the study. Relationship between individual earnings and family income is the theme of Chapter 9. Chapter 10 is concerned with an important question : Do different surveys yield similar results ? and found that they can be made to yield similar distributions and relationships. A more serious puzzle faced by many was posed in the penultimate Chapter : 'Why researchers asking similar questions and often using identical data sources had come to such sharply differing conclusions about what determines economic success ?' Even though no clear answer could be expected, there is a very useful discussion of several issues and suggestions to how best these differences can be minimized. In the last chapter Jencks compares the conclusions of the present study with those of his earlier study. In a short review of this kind, one cannot review each chapter separately, even though it seems necessary, as each chapter is written by a different author. However, apart from some of the major conclusions of the study mentioned above, we may note one or two interesting findings. Decomposing the family income into different components Joseph Schwartz investigated in Chapter 9 into the relationship between man's earnings and his wife's earnings and concluded : "It is not safe to ignore a husband's economic situation when analysing the determinants of economic success among women" and not vice versa. While all the remaining chapters were concerned

exclusively with men, this is the only chapter where women's economic status has been considered.

On the whole, Jencks again produced an indispensable work in association with another team, which like his earlier study would be the issue of discussion for years to come.

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Educational Concepts of Guru Nanak

Educational Concepts of Guru Nanak in Sidh Goshti

T.S. SODHI Mukand Publications, Ludhiana, Punjab, pp. 87. Price : Rs. 25.00

Educational Concepts of Guru Nanak in Sidh Goshti is the second book in the 'Sikh Philosophy of Education' series. The Sidh Goshti is one of the many compositions of Guru Nanak included in the Adi Granth, a sacred book of the Sikhs. The Sidh Goshti is considered the most abstruse but the way Dr. Sodhi has presented the thematic details of Sidh Goshti it has become easy to comprehend. Khushwant Singh has rightly observed in the foreword of the book :

I encountered enormous difficulties while working on the translation of the Sidh Goshti. The question and answer pattern often got confused as it was interpreted with long soliloquies, many questions and answers seemed repetitive and eluded comprehension. I found many problems that I could not solve myself, now resolved by Dr. T.S. Sodhi's eminently scholastic and clear elucidation of Sidh Goshti.

The author of the book has repetitively explained the theme of the Sidh Goshti. It is a discussion between Guru Nanak and Sidhas, who are reported to have formed a very powerful sect in those days in this

part of the country. He has made an effort to describe the different cults of Yogies. Hatha Yoga has been explained but the concept of Hatha Yoga has not been clearly elucidated. The illustrations and commentary on Sidh Goshti are better than the description of the Yogies cult.

However, Dr. Sodhi has tried to pinpoint the place where this discussion took place between Guru Nanak and Sidhas. He has given many convincing evidences to prove that the Goshti was held at Achal. Quoting Sidh Goshti Paori 7 and Paori 8 the author has concluded that Sikh ethics is socialistic while the Yoga values are individualistic. Guru Nanak emphasized the social responsibility of an individual as against escapism. Contrasting Sikhism and Hatha Yoga he has come out with a distinction that Guru Nanak practised and pleaded for a religion-oriented social life, society-oriented religious life, whereas Yogies believed in asceticism and they renounced the world—society, home and women. A long list of questions by Sidh Yogies and answers by Guru Nanak have been presented in a self-explanatory style.

In addition to the Goshti discussions Dr. Sodhi has made an effort to glorify Guru Nanak's philosophy. The attainment of Sahaj, concept of Dharma—Duty, Justice, Guide, Truth and Ideal—concept of Bhakti and Siddhi has been explained in order to understand the philosophy of Guru Nanak. In describing his philosophy, Dr. Sodhi has dwelt long on explaining idealism in the light of western thinkers and Indian thinkers. In this endeavour the author appears to be more fascinated by educational thoughts as propounded by educational philosophers in a textbook style. The treatment may not be considered up to the mark when he treats the Hindu philosophy, but he is right when he quotes Guru Nanak as one of the Indian thinkers. Guru Nanak wants that men should practise with Simran and live a pious life. He lays emphasis on the importance of becoming a pious man. Guru Nanak does not believe in superstitions.

In working out educational implications of the Sidh Goshti the author has adopted a pedagogical order. He has described the aims of education in the light of the Sidh Goshti. The realization of Absolute through religious and moral education is a must according to Guru Nanak. On curriculum, Dr. Sodhi has pointed out that to work, to be social, to help others, to participate in the economic activity, should be included in the curriculum in accordance with Sidh Goshti. As regards methods of teaching, he has identified doubting, questioning and discussing to comprehend the concepts. He further pleads for innovations like classroom interactions as an approach to teaching-learning situations

without any reference to Sidh Goshti. The pious life of the teacher and attainment of Gurubani is the essence of Guru Nanak's discussions.

He has concluded on the basis of Sidh Goshti that the ideas of social change, national integration and education for citizenship are the fundamentals of Guru Nanak's philosophy of education. However, he has failed to give convincing evidences from Sidh Goshti. But in the present situation, when western ideas and thoughts are dominating our education, this book can be described as an earnest effort to throw light on Indian educational thought.

It is high time now that we look back to our tradition and build up a system of education in tune with our cultural heritage and modern needs. This book will certainly inspire others to work upon other Indian thinkers, philosophers and educationists of past and thus, help in developing a modern philosophy of education for new India. This book will bear better fruits if experts make practical use of the suggestions and generalizations.

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An Adaptation of 'Effective Questioning' for Preservice and Inservice Teachers in India

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Minicourse I—Effective Questioning—originally developed by Borg, et al. in the U.S.A. was adapted, tested and redeveloped for use in Britain by Perrott (1975) who in collaboration with Baroda University carried out a similar study with 30 inservice teachers in Baroda using audiotapes instead of videotapes. The encouraging results obtained from this pilot experiment in Baroda encouraged the present author to adapt this course for teachers in Delhi and Haryana using English and a Hindi translation, respectively. Since microteaching experiments involving expensive videotape recorders and cameras are not economically viable at the present time in India, it was decided not to use hardware but to rely on live demonstrations, lectures and printed instructional material which can be easily duplicated. The results of these experiments were carefully evaluated and compared with those obtained by Perrott with English teachers in Lancaster. The results were similar showing that this inexpensive adaptation of the course had achieved its objectives of reducing 'teacher talk', increasing the level and amount of pupil-participation, and eliminating habits which disrupt discussion.

THIS STUDY is concerned with the effect of transferring the self-instructional microteaching course on effective questioning developed for British teachers at the International Microteaching Research Unit, University of Lancaster, to preservice and inservice teachers in Delhi and Haryana. The original Lancaster course consists of five videotaped instructional sequence in which questioning skills are demonstrated and explained. It also uses videotape recorders and cameras to record the microteaching lessons given by the

teachers which they play back for self-evaluation. It was felt that in India microteaching experiments involving expensive videotape recorders and cameras would not be economically viable at the present time. Therefore, it was decided not to use hardware but to rely on live demonstration, lectures and printed instructional material which can be easily duplicated for teachers to read.

Modification Made in the Course

Although there is sufficient evidence that audiotapes can be used just as effectively for questioning skills as videotapes, certain practical considerations caused the investigator to abandon their use for feedback. Frequent power-cuts and availability of convenient power points in the classrooms were some of them. Battery-powered cassette tape-recorders required frequent replacement of batteries. It was also found that placing a microphone near the teacher often made her extremely self-conscious and unnatural in her behaviour. The pupils were also very much aware that their replies were being recorded. During microteaching sessions the teachers requested that the tape-recorder be removed as it restricted their speech, movements and behaviour. They found the observation schedules very effective for feedback, and from the experience gained by the investigator while conducting workshops for preservice and inservice teachers, these simple paper-and-pencil observation schedules with their analysis of the components of each teaching skill made evaluation more thorough.

In these experiments, the subject saw a live demonstration of the skill by the investigator in a microteaching setting with his peers acting as school pupils, and read about the skills from the written instructional material given to him. He then gave a microlesson to his peer group practising three related skills, and the evaluation was done by the supervisor and peers via the observation schedule prepared for those three skills. Each participant played the role of a teacher, a pupil and an observer by turns in every group.

Method

Sample

It was decided to try out this microteaching course with six different experimental groups in different conditions. In order to obtain a

thorough evaluation of this course, experiments were carried out with both preservice and inservice teachers in Hindi in Haryana, and with teacher-educators in English in Haryana. If these experiments proved successful in these states, it was felt that this course on effective questioning could be used by teachers in other states after translation into their regional languages. These six groups consisted of 164 subjects (30 males and 134 females) out of which 83 were B. Ed. students, 70 inservice teachers and 11 teacher-educators. Group I consisted of 33 B. Ed. students (31 females and two males) of the Central Institute of Education who were graduates of Delhi University and well-qualified to teach subjects in humanities and sciences. Though the microteaching sessions were held in English in college in simulated conditions with peers acting as school pupils, these students were able to practise the questioning skills learnt in the sessions with their regular school pupils as well during teaching practice. Group II of seven B.Ed students (five males and two females) of the Central Institute of Education was school-based where the students practised with real pupils in regular classes in Hindi for three weeks. In Group III these 11 experienced and well-qualified teacher-educators (six males and five females) in Rohtak, Haryana, tried out the course in simulated conditions in English with their colleagues acting as school pupils. Group IV consisted entirely of females, 43 B Ed. students in Rohtak who took the Course in Hindi in the college in simulated conditions. In Group V, 34 inservice teachers (19 females and 15 males) of Rohtak had volunteered for a workshop on microteaching and did their microteaching practice in Hindi in college in simulated conditions with colleagues acting as school pupils. Group VI consisted of 36 well-qualified and experienced teachers (34 females and two males) of a private school in Delhi who took the course in English in simulated conditions after the school. They were also able to practise the questioning skills with their normal pupils in the school in the mornings.

General Procedure Followed

With each group the first day was devoted to two lectures explaining the concept of microteaching and the procedure which has been adapted to Indian conditions. The next day the investigator gave a lecture-demonstration explaining the 12 questioning skills which they were going to practise. Written instructional material on all the 12 skills was also given the participants to read at home. Model lessons

were then given by the investigator and three teachers practising three related skills at a time. These lessons were observed via the observation schedule specially prepared for these skills, then evaluated and criticized by the whole class for efficiency in practice of these skills.

The teachers were then split into groups who went into separate rooms to practise these skills in simulated conditions with their colleagues acting as school pupils. Each participant played the role of a teacher, then a pupil, and an observer by turns in every group. Three questioning skills were practised at a time. On the next day, another demonstration was given by the investigator explaining three other questioning skills. Model lessons were also given by the investigator and three other teachers which were observed and evaluated by the whole class. On the second day these three new questioning skills were combined with the three learnt the first day—thus six skills were practised in one session. On the third day after the demonstration-lecture and the model lesson, nine skills were practised in one session. On the fourth day, after the demonstration-lecture and model lesson, all the 12 questioning skills were practised by the participants.

For three groups, Group I, III, and VI, the general procedure outlined was followed. But in three groups, Group II, IV, and V, slight modifications were made. In Group II the students were unable to practise the questioning skills in groups first, but had to use them straightaway with the full class of pupils in school. In Groups IV and V, the written instructional material was deliberately not given to the participants in order to discover if they could master the skills equally well only with lecture-demonstrations and without this supplementary aid.

Questionnaire Measures

Before the course every participant filled in a form with 32 items which showed her attitude towards teaching. After the course they filled in a detailed post-course evaluation form in which they gave their opinions about different aspects of the course. For Groups IV and V who were not proficient in English these forms were translated into Hindi and the responses were also given in Hindi.

Observation Measures

For Group I the investigator visited the classrooms of 39 out of the 33 B. Ed. students before the course and observed two lessons of each

teacher and noted down in the observation schedule the number of times these teachers used these questioning skills in a 20-minute discussion lesson. These lessons were also tape-recorded to help in the evaluation in case of doubt. After the course the investigator once again observed two lessons of each teacher and recorded via the observation schedule and tape-recorder if there had been any improvement in their use of these 12 questioning skills. By means of a pre- and post-course analysis of the lessons observed and audiotaped it was possible to observe changes in the questioning behaviour such as the increased use of prompting, redirection, higher-order questions, etc.

Before the first observation, teachers were given a cue-sheet giving a detailed description of the microteaching skills. Each teacher knew before the course precisely which skills were being evaluated. The rationale for this cueing of the microteaching skills was that changes in teacher's behaviour (as measured by comparison of the pre- and post-observations) could be the result of the teacher not knowing which behaviour was to be evaluated before the course, while being knowledgeable about it after the course.

For Group VI the investigator visited the classrooms of 25 out of the 36 inservice teachers and did a similar pre- and post-course evaluation of the 12 questioning skills.

Observation Schedule for Measuring Classroom Performance

By means of tally marks the observer noted down the number of times the teacher used prompting, redirection, refocusing, sought further clarification, paused after asking questions, called on non-volunteers to answer asked questions that called for related facts or for higher thought responses, the number of times the teacher used the bad habits of repeating her own questions, repeating pupils' own answers or answered her own questions. Besides these 12 questioning skills, the percentage of discussion time taken by teacher-talk was calculated and this rating on 13 measures has been shown in Tables 3 and 4.

Feedback Schedules for three Questioning Skills during the Microlesson

During the microteaching practice sessions every observer noted down in the observation schedule the number of times the teacher used that particular skill, e.g. prompting, and put down tally marks against it. She also noted if there was an occasion when the teacher could have

used this skill but failed to do so. Usually three related skills (prompting, further clarification, refocusing) were observed in one micro-teaching session. The observer used this schedule to give objective feedback.

Hypotheses

Stating our hypotheses in a general directional form we would expect :

1. Significant increases from pre-test to post-test in the mean length of pause, the frequency of prompting, redirection, refocusing, seeking further clarification and related facts, the percentage of non-volunteers called and the percentage of higher-order questions and higher-order responses.
2. Significant decreases from pre-test to post-test in the percentage of teacher-talk and in the frequency of answering one's own questions, repeating the questions and repeating pupils' answers.

Results

Explanation : Though the investigator has taken six groups for this microteaching project and obtained results for all the groups, in this paper the investigator has only shown the results of the two groups, Group I and Group VI and compared the results with Perrott's group and the Baroda group. The reason is that only for Groups I and VI and pre- and post-course evaluation done similar to what Perrott did for her teachers in Lancaster and Baroda, and hence a comparison between the four results has been possible. For Group I, lessons of 30 out of 33 B.Ed. students were observed and evaluated before and after the microteaching course on 12 questioning skills. Similarly, for Group VI, the investigator did a pre- and post-course evaluation for 25 out of the 36 inservice teachers. Results of the 30 B. Ed. students have been shown in Table 3 and of the 25 inservice teachers in Table 4. In Table 1 Perrott has shown the results of 29 inservice teachers in Lancaster on 14 selected measures—the two extra measures she has calculated are : (i) the percentage of inadequate responses probed by teachers, and (ii) the percentage of discussion time taken by teacher-talk. In Table 2 the results have

been shown for 30 inservice teachers in Baroda, and only 12 measures have been shown. (Calling on non-volunteers was not scored for this group.) For Groups I and VI rating has been done on 13 measures (discussion time taken by teacher-talk is the 13th measure).

1. Perrott's Group (28 Inservice Teachers in Lancaster) Differences in 14 Selected Measures between Lessons Videotaped before and Immediately after Completing the Microteaching Course

Videotape recordings were taken of each teacher conducting a 20-minute discussion lesson in his classroom, both before he had taken the course and on completion of the course. Before the first recording, teachers were given general information on the length and type (i.e. discussion type) of the lesson required. In addition, they received a cue-sheet giving a detailed description of the microteaching course skills. Each teacher knew before the course precisely which skills were being evaluated. The rationale for this cueing of the microteaching course skills was that changes in teacher's behaviour (as measured by comparison of the pre- and post-course tapes) could be a result of the teachers not knowing which behaviour was to be evaluated before the course while being fully knowledgeable after the course.

Videotapes taken in the classroom were scored to determine the teacher's use of the specific skills taught in the microteaching course. The scores obtained were based on a frequency count of the number of times the teacher used the skills. In addition, the percentage of discussion time taken up by the teacher's talk was measured. An observer, present in the classroom during the videotaping sessions, scored the relative number of non-volunteers on whom the teacher called, since this skill could not be scored from the videotapes.

After the course was over, the investigator again recorded on videotape the lessons of all these 28 teachers, and rated their use of these 12 questioning skills. The difference between the mean scores before and after the course for each skill was noted, and by the *t*-test it was found if the differences were significant.

A study of Table 1 reveals that of the 14 measures obtained, clear and stable changes between pre- and post-course were found for eight measures. The changes included a large and significant reduction in the global measure of teacher-talk. There are significant increases in the number of times the teacher used the skills of 'prompting', 'seeking further clarification' and 'redirection'. There is also a significant

increase in the percentage of higher-order questions asked, and the percentage of higher-order responses received from the pupils. There is a significant decrease in the bad habits of repeating one's own questions, repeating pupils' answers, or answering one's own questions.

TABLE 1
DIFFERENCES IN 14 SELECTED MEASURES BETWEEN LESSONS
VIDEOTAPED BEFORE AND IMMEDIATELY AFTER COMPLETING
THE MICROTEACHING COURSE—PERROTT'S GROUP

<i>Measures</i>	<i>Minutes Sampled</i>	<i>Mean before</i>	<i>Score after</i>	<i>S.D.</i>	<i>t** df=26</i>
1. Mean Length of teacher's pause after questions	5	1.8	2.5	1.22	2.04†
2. Number of times teacher used prompting	20	2.2	5.5	5.99	2.06†
3. Number of times teacher sought clarification	20	4.7	7.4	3.34	2.99‡
4. Number of times teacher used refocusing	20	0.0	0.0	—	<1.00
5. Number of times teacher used redirection	20	16.5	33.6	14.96	4.30§
6. Mean length of pupil's responses in words	5	7.3	9.3	4.35	1.68
7. Percentage of teacher's questions calling for higher-order responses	5	46.8	63.5	20.02	3.61‡
8. Number of times teacher answered his own questions	20	1.3	0.7	1.27	1.57
9. Number of times teacher repeated his own questions	20	6.6	2.5	3.90	3.93‡
10. Number of times teacher repeated pupils' answers	20	30.1	6.5	10.67	8.27§
11. Percentage of discussion time taken by teacher-talk	20	75.1	53.3	14.03	5.81‡
12. Percentage of non-volunteers called on by teacher	20	13.6	11.9	14.48	<1.00
13. Percentage of inadequate responses probed by teacher	20	73.0	72.6	16.86	<1.00
14. Percentage of higher order responses from pupils	5	49.5	66.8	19.15	2.85‡

N=28 teachers

*Comparisons between means in three-factor ANOVAs (centre×time×persons). Standard deviations are pooled within-cell estimates from these analyses.

**The two extra measures are (i) the percentage of inadequate responses probed by teachers and (ii) the percentage of discussion of time taken by teacher-talk

† $p < 0.05$; * < 0.01 ; § $p < 0.005$; one-tailed

EFFECTIVE QUESTIONING FOR PRESERVICE AND INSERVICE TEACHERS

There is no change from pre- to post-course in the teacher's use of 'refocusing', the percentage of non-volunteers called on by the teacher, or the percentage of inadequate responses probed by the teacher. The mean length of pupils' responses in words do not show significant differences from pre- to post-course levels. 'Pausing' and 'answering own question' show marginal differences only.

The results obtained by Perrott are very similar to those previously obtained by Borg, *et al.* (1970) on 11 selected measures. He also noted significant improvement in the use of the skills of 'prompting', 'seeking further clarifications', 'redirection' and 'asking higher-order questions'. There was also a significant reduction in the habit of repeating one's own questions, repeating pupils' answers or answering one's own questions. The percentage of discussion time taken by teacher-talk was also significantly reduced after the course. There was no change for the skill of 'refocusing', and the increase in the mean length of teacher's pauses after questions was significant only at the .05 level.

2. Baroda Group (30 Inservice Teachers) Differences in 12 Selected Measures between Lessons Audiotaped before and Immediately after Completing the Microteaching Course

Lessons of 30 inservice teachers in Baroda were audiotaped before the course and rated for 12 questioning skills. 'Calling on non-volunteers' was not scored by the investigator for this group, as it was not possible to note this skill on the audiotape. They were then given this course of effective questioning. They read the teacher's handbook which explains the different skills, and heard the five instructional sequences which illustrate the different skills with model lessons on audiotapes. They prepared and conducted a microlesson which was also recorded on audiotape, and they got self-feedback by playing back the tape to evaluate their correct use of the skill. They did this for each separate skill, and refined the use of each skill by replanning and reteaching. After the course was over, the investigator again recorded on audiotape the lessons of all these 30 teachers and rated their use of these 12 questioning skills. She then found the difference between the mean scores before and after the course, and by using the *t*-test, she noted if these differences were significant.

When we look at Table 2 we note that the difference between pre- and post-course measures for all the questioning skills are significant at the .01 level. Hence the investigator noted clear and stable changes in

each of the skills, a reduction in the three bad habits, and a significant decrease in the percentage of discussion time taken up with teacher's talk. Thus, according to these results, the teachers have shown a definite improvement in the use of these 12 questioning skills after the course.

TABLE 2
DIFFERENCES IN* 12 SELECTED MEASURES BETWEEN LESSONS
AUDIOTAPED BEFORE AND IMMEDIATELY AFTER
COMPLETING THE MICROTEACHING
COURSE—BARODA GROUP

<i>Measures</i>	<i>Minutes Sampled</i>	<i>Mean Score before</i>	<i>Mean Score after</i>	<i>t df = 29</i>
1. Mean length of teacher's pause after questions	20	18.93	60.70	3.95**
2. Number of times teacher used prompting	20	3.37	11.97	6.92**
3. Number of times teacher sought clarification	20	6.53	9.70	3.07**
4. Number of times teacher used refocusing	20	0.43	2.57	5.26**
5. Number of times teacher used redirection	20	7.97	22.57	6.94**
6. Number of times teacher called for sets of related facts	20	0.37	1.53	4.17**
7. Percentage of teacher's questions calling for higher-order responses	20	1.70	4.80	6.39**
8. Percentage of higher-order responses from pupils	20	0.93	5.57	5.69**
9. Number of times teacher answered his own questions	20	1.77	0.17	4.36**
10. Number of times teacher repeated his own questions	20	7.03	1.53	4.97**
11. Number of times teacher repeated pupils' answers	20	10.93	1.00	7.97**
12. Percentage of discussion time taken by teacher talk	20	58.76	38.44	10.04**

N=30 teachers ** significant at .01 level

*Calling on non-volunteers was not scored for this group.

Percentage of discussion time taken by teacher-talk has been calculated.

3. *Paintals Group I (30 B Ed. Students)*

(a) *Difference in Teaching Behaviour in 13 Selected Measures between Lessons Observed before and Immediately after Completing the Microteaching Course*

Group I : In this group two lessons each of 30 B.Ed. students of the Central Institute of Education were observed by the investigator in their respective schools before the course began. The students were shown the observation schedule and informed about the questioning skills which would be observed by the investigator. They were asked to give a discussion-type lesson which was observed and rated by the investigator for 20 minutes. The lesson was also recorded on the audio cassette tape-recorder. The investigator by means of tally marks noted the number of times the teacher used each of these 13 skills.

The same procedure was followed after the course, and the investigator observed and rated the number of times the teacher used each teaching skill. The investigator then noted the mean of the two lessons for each of the questioning skills for all the 30 teachers observed before the course. She then found the average for the 30 teachers for each of the questioning skills, e.g. the mean number of times the teacher used 'prompting' before the course.

Similarly, the investigator calculated the mean of the two lessons for each of the questioning skills for all of the 30 teachers observed after the course. She then found the average for the 30 teachers for each of the questioning skills, e.g. the mean number of times the teacher used 'prompting' after the course. She then found the difference between the two means, and by using the *t*-test she found that the differences were significant.

A study of Table 3 reveals that for the first skill, 'pausing after asking a question', the investigator found that the difference between pre-course and post-course was not significant. For the second skill, 'prompting', the investigator found that the difference after the post-course was definitely significant. Also the difference after the post-course was definitely significant. Also the difference between pre-course and post-course measures for the skill of 'seeking further clarification' was significant. Hence these students had shown definite improvement in their use of these two skills after the course.

For the skill of 'refocusing', the difference is marginal, and the *t*-value is significant only at the 05 level, but not at the 01 level. The students have also shown definite improvement in their use of the skill

TABLE 3

DIFFERENCES IN TEACHING BEHAVIOUR IN 13 SELECTED
MEASURES BETWEEN LESSONS OBSERVED BEFORE AND
IMMEDIATELY AFTER COMPLETING THE MICROTEACHING
COURSE—GROUP I

<i>Measures</i>	<i>Minutes Sampled</i>	<i>Mean Score before</i>	<i>Mean Score after</i>	<i>t df= 29</i>
1. Mean length of teacher's pause after questions	20	1.86	2.32	1.12
2. Number of times teacher used prompting	20	2.37	6.53	4.16**
3. Number of times teacher sought clarification	20	4.33	7.91	4.31**
4. Number of times teacher used refocusing	20	.26	1.83	2.38***
5. Number of times teacher used redirection	20	9.32	18.57	9.43**
6. Number of times teacher called for sets of related facts	20	.34	1.98	3.35**
7. Number of times teacher answered his own questions	20	1.12	.27	4.46**
8. Number of times teacher repeated his own questions	20	7.21	1.46	9.91**
9. Number of times teacher repeated pupils' answers	20	11.35	2.13	12.29**
10. Percentage of higher-order questions	20	33.60	55.80	7.20**
11. Percentage of higher-order responses from pupils	20	20.20	34.70	4.29**
12. Percentage of non-volunteers called	20	10.60	13.80	2.04**
13. Percentage of discussion time taken by teacher-talk	20	62.30	40.10	10.82**

*Percentage of discussion time taken by teacher-talk has been calculated as the 13th measure.

**significant at .01 level

***significant at .05 level

of 'redirection', and 'asking questions that call for a set of related facts'. Both the differences are significant at the .01 level

The students have also shown a reduction in frequency of the three bad habits of answering one's own questions, of repeating one's own

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questions, and repeating pupils' answers. The differences between pre- and post-course measures for these three habits are significant. There are also clear and stable changes between pre- and post-course measures for the percentage of higher-order questions asked by student-teachers, as well as the percentage of higher-order responses obtained from pupils. But the most important change is a consistent reduction in the percentage of discussion time taken up with teacher-talk. There is also an increase in the percentage of non-volunteers called on by the student-teacher, but the difference is significant only at the .05 level, and not at the .01 level.

TABLE 4
DIFFERENCE IN TEACHING BEHAVIOUR IN* 13 SELECTED MEASURES
BETWEEN LESSONS OBSERVED BEFORE AND IMMEDIATELY AFTER
COMPLETING THE MICROTEACHING COURSE—GROUP VI

	<i>Minutes Sampled</i>	<i>Means Score before</i>	<i>Mean Score after</i>	<i>t df=24</i>
1. Mean length of teacher's pause after questions	20	1.51	2.56	2.69***
2. Number of times teacher used prompting	20	3.12	9.35	6.49**
3. Number of times teacher sought clarification	20	4.12	8.89	4.26**
4. Number of times teacher used refocusing	20	.35	1.02	1.24
5. Number of times teacher used redirection	20	11.35	23.49	8.43**
6. Number of times teacher called for a set of related facts	20	.46	1.82	3.78**
7. Number of times teacher answered her own questions	20	1.67	.62	2.70***
8. Number of times teacher repeated her own questions	20	8.05	1.74	9.41**
9. Number of times teacher repeated pupils' answers	20	15.38	3.85	10.67**
10. Percentage of higher-order questions	20	37.30	52.00	6.34**
11. Percentage of higher-order responses from pupils	20	18.60	25.30	4.75**
12. Percentage of non-volunteers called on	20	9.37	11.58	1.96
13. Percentage of discussion time taken by teacher-talk	20	61.34	45.19	7.48**

*Percentage of discussion time taken by teacher-talk has been calculated as the 13th measure

significant at .05 level *significant at .01 level

4. *Group VI—25 Inservice Teachers of St. Thomas School, Delhi*

A study of Table 4 reveals that for the first skill, 'pausing after asking a question', the 25 inservice teachers have shown an improvement, but the difference is significant only at .05 level, not at the .01 level. For the four skills of 'prompting', 'seeking further clarification', 'redirection' and 'asking questions that call for a set of related facts', the differences between pre- and post-course measures are significant at the .01 level. The teachers have definitely shown improvement in these skills.

For the two bad habits of repeating one's own questions and repeating pupils' answers, there is certainly a significant reduction in their occurrence after the course. Answering one's own questions has also shown a reduction in frequency, but the difference is significant only at the .05 level. There is also a significant increase in the percentage of higher-order questions asked by the teachers, and the percentage of higher-order responses obtained from the pupils. There is not a significant difference in the percentage of non-volunteers called on by the teacher after the course. Probably, these experienced teachers were already competent in this skill before the course began, and hence this course had not affected their use of it.

For the skill of 'refocusing' we also find that the increase is not significant. This is probably due to the fact that this skill is found difficult by most of the teachers as they have reported that they do not find much opportunity in the class to use it appropriately. There is significant reduction in the percentage of discussion time taken up by teacher's talk which is an important change in the teacher's behaviour.

(b) *Comparison of the Four Groups (Groups I, VI, Baroda Inservices Teachers and Perrott's Group of Inservice Teachers)*

Comparing the four groups, we are impressed by the similarity of results in all the four groups. Looking at Table 5, we find that all the four groups have shown significant improvement in the use of the skills of 'prompting', 'seeking further clarification' and 'redirection'. There is also a significant increase in the percentage of higher-order questions asked, and the percentage of higher-order responses received by pupils. There is an obvious reduction in the two bad habits of repeating one's own questions and repeating pupils' answers. The percentage of discussion time taken by teacher-talk in all of the four groups is significantly reduced.

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TABLE 5

COMPARISON OF THE FOUR GROUPS—DIFFERENCES IN
13 SELECTED MEASURES BETWEEN LESSONS OBSERVED
BEFORE AND IMMEDIATELY AFTER COMPLETING
THE MICROTEACHING COURSE

	<i>Perrott's Group</i>	<i>Baioda Group</i>	<i>Group I</i>	<i>Group VI</i>
	<i>28 Inservice Teachers</i>	<i>30 Inservice Teachers</i>	<i>30 B.Ed. Students</i>	<i>25 Inservice Teachers</i>
	t df=26	t df=29	t df=29	t df=24
1. Mean length of teacher's pause after questions	2.04†	3.95**	1.12	2.69*
2. Number of times teacher used prompting	2.06†	6.92**	4.16**	6.49**
3. Number of times teacher sought clarification	2.99†	3.07**	4.31**	4.26**
4. Number of times teacher used refocusing	<1.00	5.26**	2.38*	1.24
5. Number of times teacher used redirection	4.30†	6.94**	9.43**	8.43**
6. Number of times teacher called for sets of related facts		4.17**	3.35**	3.78**
7. Number of times teacher answered his own questions	1.57	4.36**	4.46**	2.70*
8. Number of times teacher repeated his own questions	3.93†	4.97**	9.91**	9.41**
9. Number of times teacher repeated pupils' answers	8.27†	7.97**	12.29**	10.67**
10. Percentage of higher-order questions	3.61†	6.39**	7.20**	6.34**
11. Percentage of higher-order responses	2.85†	5.69**	4.29**	4.75**
12. Percentage of non-volunteers called	<1.00	4.24**	2.04*	1.96
13. Percentage of discussion time taken by teacher-talk	5.81†	10.04**	10.82**	7.48**

*significant at .05 level

**significant at .01 level

†significant at .005 level

The habit of answering one's own questions show significant differences at .01 level between pre- and post-course measures for two groups, Baroda Group and Group I, for Group VI at the .05 level only and Perrott's Group shows no significant difference. The length of teacher's pause after questions shows a significant increase at .01 level for one group only (the Baroda Group), at the .05 level for two groups (Perrott's Group and Group VI) and no significant increase for Group I.

The skill of 'refocusing' shows a significant improvement at the .01 level for the Baroda Group only, at the .05 level for Group I and no significant increase for Group VI and Perrott's Group. The percentage of non-volunteers called shows significant improvement at .05 level for only Group I. The other two groups, Group VI and Perrott's Group, show no significant improvement. The Baroda Group was not scored for this skill at all because the audiotape could not record this skill. The reasons for no improvement in this skill for inservice teachers could be that these experienced teachers were already competent in this skill before the course began, and consequently this course had not affected their use of it. This could also be the reason for not getting a very great difference in the number of times the teacher answered his own questions. These experienced teachers are already aware that this is a bad habit, and so seldom used this in class.

Discussion

The results of our two groups, Group I and Group VI, clearly show that the course on effective questioning had achieved its objectives of 'reducing teacher-talk', 'increasing the level and amount of pupils' participation', and eliminating habits which disrupt discussions. Though the procedure used in Delhi, India, was different from that used in Lancaster, U.K., the results which we obtained were very similar to theirs. We conducted our experiments without use of any hardware as videotape equipment is not economical in Indian conditions. We only used lectures and live-demonstrations to illustrate the questioning skills, in contrast to the Lancaster experiment where teachers viewed instructional videotapes and saw model lessons on television. Also for feedback we used supervisors and peers who gave oral criticism, in contrast to the Lancaster teachers who replayed their lessons on videotapes for self-evaluation.

All we used was written instructional material where the 12 questioning skills were explained. This consisted of a few pages which could be cyclostyled and duplicated easily for distribution to the teachers. This inexpensive adaptation of the Lancaster course on effective questioning was quite successful as both groups, the student-teachers in Group I, the experienced inservice teachers in Group VI, had shown significant improvement in the use of the questioning skills and in reduction of undesirable habits. As a result of this course there was a significant reduction in the percentage of discussion time taken up with the teacher-talk. There was a significant increase in the percentage of higher-order questions asked by the teachers and the percentages of higher-order responses obtained from the pupils.

The patterns of observed change noted by the investigator show a close correspondence with the teacher's own report of the effects of the course on their teaching behaviour. We note that for all the six groups and for all the 12 skills, an average of only 8 per cent of participants reported the need for further instruction. Out of this, the highest proportion occurred for the skill of 'refocusing' where 21 per cent of subjects reported the need for further assistance in this skill. From our observations we have already noted that for this skill there was no significant improvement in Group VI, and only marginal improvement in Group I which is significant only at .05 level.

An average on 50 per cent of our participants have reported that as a result of this course they are now confident in the use of these skills, and 37 per cent reported that they were already using each skill appropriately before the course. We find that a very small number of teachers have noted that they need instruction in the skills of 'prompting', 'seeking further clarification', and 'redirection', as they are already proficient in the use of these skills. This corresponds with the observations noted by the investigator after the course, where both the groups had made significant improvements in the use of the skills of 'prompting', 'seeking further clarification', and 'redirection'. There was also a significant reduction in the frequency of bad habits used by the teachers after the course. This also corresponds with the observations made by the teachers where a majority of them have reported that they have eliminated these bad habits, and only a small percentage have asked for further assistance in their elimination.

We can also compare the observations made with the teacher's reports of the influence of the course on their pupils' behaviour. We note that an average on 56 per cent of participants have reported an

improvement in the quality of answers given by their pupils and in the level of pupil participation. Sixty-two per cent have reported an improvement in the attention and interest of pupils, and 41 per cent in the discussion skills of pupils. We note, in looking at the two groups (I and VI) that there is a significant increase in the percentage of higher-order responses given by the pupils. This corresponds with the reports made by the teachers on the influence of this course.

Conclusion

The results of Group I and Group VI clearly show that this course on effective questioning had achieved its objective of reducing teacher-talk, increasing the level and amount of pupil-participation and eliminating habits which disrupt discussion. Though the procedure used in Delhi was different from that used in Lancaster and the microteaching experiments were conducted without the use of any hardware, the results obtained were very similar to the Lancaster experiment.

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An Assessment of the Relation between Teacher-trainees' Attitudes and Performance in Theory and Practice of Teaching

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SINCE the world of work is stratified varied talents are called for varied careers. Selecting a person for professional course needs careful consideration of several variables. One presage variable attitude is usually regarded as an important correlate of successful performance. Technically attitude may be defined as "a dispositional readiness to respond to certain situations, persons or objects in a consistent manner which has been learned and has become one's typical mode of response" (Freeman 1965).

Teaching is a career and like any other profession aspirants crowd to this vocation and as a passport to it, seek admission into the colleges that offer training of teachers. In order to ensure the entry of the fittest candidate, the management has to use certain amount of screening. Using teacher attitude inventory to predict teacher success is routine in western countries. For several years, a particular teacher training institute in Madras was administering a standardized teacher attitude inventory (TAI) as a predictor of worthy candidates for the B.Ed. course. The present paper contains an analysis of the scores on teacher attitude inventory with their performance as indicated by their practice teaching marks and scores in the final B.Ed. examination.

Assumptions

The search for the candidates with positive attitude for teaching is now several years old. Certain assumptions may be laid down here as the basis for such enquiry.

First and foremost, the teacher training institutes aim to produce efficient and effective teachers. The criterion measure for teaching efficiency, in the training colleges, would be their performance during preservice training, that is their scores during practice teaching. The sanctity of training rests on the assumption that the performance which is scored on the rating sheets is valid indicators of their teaching efficiency later in the schools.

Secondly, the theory papers in B.Ed. are the theoretical bases of teaching as a discipline. As such, there should be a correlation between these two measures. In other words, a good efficient teacher (defined by his high scores in practicals) should also score well in the theory papers.

Thirdly, since efficient behaviour is stimulated by positive attitude, a teacher with a positive attitude to teaching will make an efficient teacher. Hence a good teacher attitude scale which can identify teacher attitude effectively will have prognostic value in forecasting teacher efficiency. Therefore, the scores on attitude scale should tally with the scores in practice teaching as also in the theory papers.

Related Studies

Number of research studies had searched this problem of relationship between success in teaching and attitudes. The studies may be broadly divided into three categories, namely (i) studies concerned with the construction and validation of teacher attitude inventories, (ii) studies searching the correlates of teacher efficiency, and (iii) studies directly concerned with the predictive validity of a particular teacher attitude inventory.

The most renowned study in the first category is the work by Cook, *et al.* (1950) who developed an attitude inventory and named it as the Minnesota teacher attitude inventory (MTAI). In a ten-year long research they found that the attitude of teachers towards children and school work was significantly correlated with the teacher-pupil relationship prevailing in the classroom. Hence they designed this inventory to predict

how well the teacher will get along with the pupils and also how well satisfied he will be with teaching as a vocation. The most direct use of this attitude inventory would be the selection of students for teacher preparation.

Originally they wrote out 756 statements which reflect the attitudes of the teacher and consulted headmasters of 70 schools. Then by Likert method they prepared the final scale with 150 items and validated them by giving it to a random selection of 100 teachers. Their scores was correlated with pupils' (25 for each 100 teachers) attitude score to their teachers. It tallied with .93 of positivity. The reliability of the tool by split-half method was .92.

At home, several researchers constructed, validated and correlated teacher attitude inventories (Dutt and Roy Chowdhury 1958, Bhattacharya and Saha 1966, Singh 1970, Mehrotra 1973, Singh 1979, etc.). Since they are almost similar to Cook's study mentioned above, they need not be recounted here.

Coupling the other two varieties of studies, we present a resume of such studies that dealt with the relationship between the teachers' attitude, experience and performance. These studies as may be seen are not unequivocal about the type of relationship between these variables. A host of researchers find negligible or negative correlations between them (Raina and Raina 1968, Sharma 1970, Singh 1970, Ahluwalia 1974), while Samantaroy (1971), Mehrotra (1973) noted that superior efficiency of graduate teachers went with favourable attitude.

Some researchers camp upon another surprising result that longer the experience of the teachers lower their scores were on the attitude scale (Sandgren and Schmidt 1957, Beamer and Ledbetter 1957, Rubinowitz and Resenbaum 1960). But Stein and Hardy (1957) showed that teacher attitude remained unaffected by age or teaching experience. Thus efforts to find reliable predictors of teaching efficiency met with little success (Lefevre 1967).

The results of these studies led one to wonder whether selection of teachers could be confidently made on the basis of TAI scores.

The Objective

The objective of the present study is to find out the predictive validity of TAI in terms of enhanced scores in practice and theory examination. In other words to find out if any relationship exists between

the attitude of the teacher-trainee with their performance in the practical examination. In case positive relationship is not evident, would it be wise to continue to select trainees on the basis of TAI or should this procedure be scrapped? With these questions in mind, and from the guidelines provided by the studies quoted, the following hypotheses were framed.

Hypotheses

1. There would be no relationship between the scores on TAI and the scores in teaching practice
2. There would be no relationship between the scores on TAI and the scores in theory examination.

Problem and Variables

The problem is thus restated as the relationship of teacher attitude to their practical and theory marks in the examination. The variables were: (i) teacher attitude score on a standardized teacher attitude inventory (TAI), (ii) marks of the practice teaching, and (iii) scores (converted to grade point average) in theory papers.

Sample

The sample consisted of 76 teacher-trainees randomly selected from 200 teacher-trainees, who were called for interview in a particular teacher training institute of Madras

The Tool

The tool was a teacher attitude scale (TAI) developed by Dutt and Roychowdhury (1958). The scale was standardized on 465 teachers. As a first step 150 student-teachers were asked to give 150 statements regarding teaching. Fifty judges were given a bundle of 102 response sheets. These statements were arranged according to favourableness of the expressed attitude. Thus the items were scaled according to Likert

method after returns were received from the judges. Reliability was tested by alternate forms and the finding registered a positive correlation (r) of .68. For further validation the scale was administered on 100 secondary schools. While correlating the score on the inventory, the authors of the tool noted a low positive correlation of .16 with the age of the teachers. The tool contained 25 questions each of them having varying values. The total values add up to 100.2. But higher the summated value, more negative is the attitude. Some of the statements of the attitude scale are as follows. The subjects were asked to put tick or cross according to their support or disagreement of the statement:

1. I shall never give up teaching.
2. I like teaching because I like children.
3. Sometimes I like teaching, sometimes not.
4. I like to teach in a higher secondary school as it has more pay scale.
5. I dislike teaching because of the hard preparation each lesson demands

Each answer carries a value and higher the value of the answer lower is the positive attitude of the teacher. For instance, the first two statements have very small value for 'yes' answers, whereas the last two have very high value for an affirmative answer.

Scoring

Since the total values added up to 102 the people with best attitude were those with scores 25 and less. People scoring 76 to 100 were those with poorest attitudes. The whole sample was thus originally divided into five groups of very poor (90-100), poor (75-89), average (50-74), good (25-49) and very good (25 and below). The very good category was assigned 5 points, good as 4 points, average as 3 points, poor as 2 and very poor as one point. None of the Ss earned 2 points or less. Hence the sample was stratified as better attitude ($n=25$), average attitude ($n=31$) and poor attitude ($n=14$).

For the practice teaching score, the summated score in both the teaching subjects were taken. The means and SD were calculated and those whose score lay below one SD were taken as poorer teachers, those

with scores above one SD were regarded as the better teachers. The rest fell in the average category. The mean was calculated 111.5 and SD was 10.6. Anybody above 122.1 was regarded as high efficiency teacher and anybody below 100.9 as low efficiency teacher. The break-up of the sample ($n=76$) is as follows :

High efficiency teacher ($n=17$)
 Average efficiency teacher ($n=54$)
 Poor teachers ($n=5$).

For the theory marks, first semester grade point average was taken. Mean GPA was calculated as 4.1 and SD as .71. The people scoring one SD above the mean GPA (i.e. 4.8) were regarded as high achievers ($n=9$) and those scoring one SD below the mean (3.4) were to be regarded as poor achievers ($n=7$), the people whose scores lay between these two cutting points were to be treated as averages ($n=60$).

Procedure and Design

No casual relationship is predicted or assumed. Only the associational study design was undertaken. For this study, the sample was selected from the original 200 trainees who were called for interview. They were homogeneous with regard to their educational level (graduates) and sex (women). The TAI scale was administered to all of them. It was explained that this was not a test as there was no right or wrong answer to these statements. They had to indicate their own convictions regarding teaching by a check-mark when they agreed and by a cross when they disagreed.

Of this population, 110 were admitted to the B. Ed. course, though the basis of selection was not singly their score on TAI. A random selection of 76 subjects were chosen, whose practice teaching marks and first semester grade point average were taken from the office register at the end of the training (1979-80). The TAI scores of the same subjects were collected and they were stratified into teachers with poor attitudes, moderate attitudes and better attitudes as explained earlier. Similarly, three groups were identified from their theory marks. Three sub-samples were identified from their practical marks. Thus nine contrasts were built up.

A 3×3 contingency chi-square between TAI scores and practice

teaching scores and 3×3 contingency between TAI scores and theory education were set up. The results are presented in Tables 1 and 2

TABLE 1
CHI-SQUARE BETWEEN TEACHING PRACTICE SCORES
AND ATTITUDE SCORES

Achievement in Teaching Attitude	Under- Achievers		Moderate Achievers		High Achievers		Total n	χ^2	df	p
	Fo	Fe	Fo	Fe	Fo	Fe				
Poor attitude	2	.92	10	9.94	2	3.13	14	4.23	4	NS
Moderate attitude	2	2.4	30	26.2	7	8.2	37			
Better attitude	1	1.6	14	17.7	8	5.9	25			
Total	5		54		17		76			

In Table 1, the chi-square was worked out of the scores of the Ss having poor attitudes ($n=14$), Ss with average attitude ($n=37$) and Ss with better attitude ($n=25$) with the Ss who achieved highly in practice teaching ($n=54$) and Ss achieving poorly in practice teaching ($n=5$). The distribution of the Ss with poor attitudes in the various categories of achievement was given in this table as two plus ten plus two. Similarly those with better attitude were distributed into better achievement, moderate achievement and poor achievement as the following: under-achievers ($n=1$), moderate achievers ($n=14$) and high achievers ($n=8$). The distribution indicates a lack of relationship as the Ss with poor attitude do not have a concentration of poor achievers or the Ss with better attitude do not have large number of high achievers. However, chi-square analysis was undertaken following Garret's model. The summated value of chi square is found to be very small, namely $\sum \chi^2=4.23$. With four df (degree of freedom) the minimum value to reject the hypothesis would be 9.49 at .05 level and 13.27 at .01 level. Thus the null assumption of zero correlation could not be rejected. Hence there is no relationship between better attitude and high achievement in practice teaching.

What is the relationship between performance in theory and attitude score? The second hypothesis that there is no relationship between these two variables was tested by a chi-square and Table 2 represents the results.

TEACHER-TRAINEES' ATTITUDES AND PERFORMANCE

TABLE 2
CHI-SQUARE BETWEEN THE MARKS IN THEORY
EXAMINATIONS AND SCORES ON TAI

Attitude GPA	Poor GPA		Moderate GPA		High GPA		Total	X ²	df	p
	Fo	Fe	Fo	Fe	Fe	Fe				
Poor attitude	2	1.2	11	11.0	1	1.65	14	1.99	4	NS
Moderate attitude	2	3.40	30	29.2	5	4.38	37			
Better attitude	3	2.30	19	19.73	3	2.96	25			
Total	7		60		9		76			

The chi-square analysis between the students' performance in theory papers (GPA) and their TAI shows non-significant results. The Ss with poor attitude do not have poor GPA nor the subjects with high attitude, higher GPA. The summated chi-square value of 1.99 is much less than 13.27 to reject the null-hypothesis of zero correlation. Thus as per chi-square (Table 2) there is no relationship between pupils' score on the TAI and performance in theory examination.

Conclusion and Educational Implications

The purpose of this study was to identify if any relationship exists between scores on TAI and the trainees' performance in their practical teaching and theory examination. The hypotheses were set up in null form, that there would be no correlative high score on TAI. These hypotheses were tested by chi-square and could not be rejected. The pupils with high attitude do not get high score in practice teaching. The relationship between attitude score and achievement in theoretical subject is also insignificant.

This conclusion is not unexpected in view of the result of earlier studies. Some studies even indicated that as pupils get on in age and experience their scores in TAI diminish, though it may be assumed that their quality and expertise in teaching became better. Thus there seemed to be an inverse ratio between pupils' score of TAI and performance. The present study, however, did not go in for a follow-up study.

Would the implication be that one would stop cultivating positive attitude towards teaching as this is in no way related with performance

and efficiency in teaching ? Or the use of TAI may be stopped as a predictive instrument for admission of students ?

Either would be a hasty conclusion. Because there may be certain components of teacher effectiveness which are highly correlated with positive attitude score. Study by Deo (1980) showed that the verbal interaction of the teacher is very positively correlated with high score in attitude. The rating scales used by the training colleges for measuring teacher competence may not be sensitive enough to note that particular aspect of interaction hence due credit might not have been given to the teacher-trainees and the teaching score did not show a corresponding hike. Quraishi's study (1972) may be recalled which showed that teachers' democratic attitude is considerably related to indirect teacher behaviour. If democratic classroom is a desired climate for growth and learning a positive attitude surely would be an asset.

Teacher effectiveness is a complex phenomenon ; to predict success on the basis of only one component, namely attitude, is hardly possible. Multiplicity of components, i.e. teachers' personal traits, ability to communicate, pupils' acceptance, the immediate environment in the classroom may affect the result.

With these considerations it is hardly justified to scrap the system of administering the TAI. Possibly more thorough investigation of other variables such as the teachers' personality, socio-economic status, interaction pattern and teaching style may help pinpoint the variable what makes a teacher effective. A positive attitude towards a vocation one has chosen would certainly boost the moral health of the person as he would be able to derive job satisfaction. Attitude and behaviour are intricably bound up but behaviour may be affected by several interpolating variables besides attitude. Inability to isolate each of these variables would not decrease the value of attitude scale though a modification of the scale may be undertaken to yield more precise prediction. By isolating other correlated factors it may be possible to frame a predictive model—a scale which will be multipronged to look into other necessary qualities and teacher-trainees may be selected according to that normative model.

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Developing an Ascendance-Submission Reaction Scale for Hindi-Speaking Adolescent Population

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IN ALMOST every social situation there is in a sense a conflict in the personality of the individuals. Allport (1971) says when any two persons come 'face to face' one ordinarily finds it convenient to yield while the other prefers to dominate. This role-taking occurs in friendly as well as unfriendly situations. These roles are not decided for ever and for all situations; also a single act of individual does not characterize him as ascendant or submissive. In sum total of responses, if taken over a period of time, it is possible to describe bend of one's personality. Most people are ascendant on one occasion and submissive on another. Ascendance and submission are two different personality traits but are regarded as one for the sake of convenience by many psychologists.

The scale for measuring ascendance-submission was first designed by Allports in 1928. The form for men was subsequently revised in 1934 and for women in 1939. Since then the revised forms are being used by different investigators in the field of vocational section and placement (Nunnally). The scale being in English language and presenting situational contexts alien to Indian population led to the necessity of developing this new scale.

The author is thankful to Prof. S.N. Jha, Department of Education, Lucknow University for his valuable suggestions.

Ray Chowdhury and Hundal (1958) had developed Allport's A-s reaction scale for Indian population and prepared regional norms. They have standardized the scale forms separately for both the sexes. But their adaptation remains in English medium. Simple English has been used by these investigators in place of some western phrases and expressions. It was in fact meant for educated Indians who could understand English language. Keeping in view the present standard of English it was felt that the respondents will feel more at home in Hindi. Bhogle and Rao (1965) and subsequently Dwivedi (1978) prepared scale for Hindi-speaking Indians. But in both the scales the importance of environmental difference in the two sexes was not given due consideration. It was very much felt that every diagnostic situation for men is not equally diagnostic for women. This view is in agreement with Allport's study in which form for men was applied on 47 women. The median score —1.0 changed to— 8.2 for women. Separate forms for both the sexes were, therefore, imperative.

The scoring method employed by Allport (1928) was based on ratings by self, associates and teachers, is rather complex. The raters were asked to rate subjects on a six-point scale carrying scores from 6 to 1 in order of degree of ascendance to submission. A simple and straightforward method of scoring was, however, adopted in this investigation. Each item having three alternatives weightage 1, 0, —1 was assigned to ascendant, average and submission categories, respectively. Particular care was taken not to sacrifice content for the sake of format wherever only two alternatives were considered adequate weightage was given accordingly. In assigning weightage, expert psychologists were consulted. Parneswaran (1961) has also assigned 0, 1 and 2 values to extremely/submissive, middle and extremely ascendants, respectively. He has adopted three alternative schemes throughout his inventory. In this study the minus (—) sign has been preferred for submission in order to identify such cases easily and the total score of the individual is the algebraic sum of numbers allotted to the choices.

Steps in Developing the Scale

The scale was developed in the following sequence step by step.

1. Selection of Items

It was considered appropriate to base the scale on Allport's A-s

reaction scale, well known for its content validity. Care was taken to present situational context that come under the purview of intermediate students and they were required to select choices most closely related to their own mode of adjustment. Every item of the scale described some characteristic or the other of ascendancy-submission. The following is the list of 18 characteristics intimately associated with ascendancy :

Self-confidence, initiative, solicit funds and talk about money, to act on one's own convictions even at the cost of conspicuousness, to safeguard one's interest even if it inconveniences others, to act according to one's own desires and remains assertive in behaviour, to resist violation of right even if trivial, uninhibited and makes others feel his importance, tough, unyielding, stubborn and counter suggestible, opposes others openly, puts himself in an advantageous position and bullies others, tries to occupy foreground, firm, rigid and determined, accepts responsibility willingly, feels annoyed and irritable when denied self-expression, prefers to take up leaders' role, resists domination of others on self, aggressive and short-tempered, just the reverse are the characteristics associated with submission.

In some of the items more than one characteristic was tested. In all there were 11 items and sub-items based on submission and the remaining on ascendancy. This division was for the sake of convenience and was not based on any rule. The two forms were referred to three experienced and competent members of the teaching staff of Lucknow University, two from the Department of Psychology and one from the Department of Education. After revision in the light of suggestions given by the experts the forms were ready for preliminary try-out.

2. *Preliminary Tryout*

It (a) furnished data for item-analysis and also relevant information regarding items, (b) was helpful in diagnosing weaknesses of instructions and format, (c) was helpful in finding total time required for the completion of the scale, and (d) facilitated in deciding length of the two forms. The forms were administered to 79 boys and 85 girls of Classes XI-XII of Lucknow. Students were asked to read instructions carefully given at the top of the forms and make an effort to respond to each item spontaneously and truthfully. It was further clarified that if there was

any situation in the items of which they had no experience they should imagine the situation and draw their probable reactions and indicate the responses. Difficulties encountered by the subjects in going through the test were noted and suggestions invited. The analysis of the forms was done with two types of weight values, viz. (a) Allport's original values and (b) the simple values 1, 0, -1 corresponding to the trend of ascendancy, normalcy and submissiveness, respectively, exhibited in the items. The results of the two types of weights indicated no appreciable difference between the corresponding distribution of ascendancy-submission. In this connection it is worthwhile to note what Nunnally (1967) says : differential weights seldom make an important difference. The means in both the cases were found to be positive, i.e. displaced towards ascendancy as reported earlier by Allport (1928, p. 131). Thus weights 1, 0, -1 were considered more profitable.

3. *The Discriminative Power of Items*

Needful changes obtained in step one after referring to experts were made. In order to obtain the desired mean value 0 of the scale, a couple of items describing slightly anti-social feeling normally attached to ascendancy were added. Cattell (1944) says that Allport in his scale has depicted an unhued picture of ascendancy, which is perhaps responsible for shifting mean little towards plus side. Thus a couple of items incorporating characteristics like bullying, unkindness, headstrongness, etc. were added. The modified forms were administered to 207 boys and 202 girls of intermediate classes. The forms were scored according to weight scheme 1, 0, -1. A comprehensive chart depicting response of each subject on each item of the scale was prepared to help in finding out each student's score and frequency of each choice. The subjects were arranged score-wise starting from the most ascendant to the most submissive. In order to find out items having significant discriminating power, the critical ratio (CR) for the difference between the means of the most ascendant and the most submissive were calculated. Thus two separate tables for the 25 per cent most ascendant and 25 per cent most submissive groups, item-wise, were constructed and corresponding mean M_1 and M_2 of each item was calculated. The standard error of the mean (σ_D) was also calculated. This helped to calculate $CR = (M_1 - M_2) / \sigma_D$ for each item. Further, it was necessary for each item to be discriminating that $(M_1 - M_2)$ be positive. Thus one-tailed test (Ghiselli 1964) of significance was considered appropriate. If the calculated critical value

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exceeded 1.65, the difference in the mean would be significant at 0.05 level. The CR values obtained showed that 10 items out of a total of 49 (boys' forms) fell short of figure of 1.65 and were discarded being indiscriminative. After rejection, the modified scores of the subjects were again worked out. The highest and the lowest 25 per cent were almost the same and the consequent changes were made in the tables for item-analysis. It was found that the CR values of the retained items (39 for boys and 35 for girls) stabilized at values greater than 1.65. The data were analysed for calculation of mean and standard deviation and is presented in Table 1. As estimated the mean was approximately zero.

4. Stability and Internal Consistency

The fourth step was taken with the retained items. On the basis of the suggestions made by the subjects only minor changes were introduced to finalize the forms, which were then administered to 202 boys and 200 girls. Forms were scored according to the scheme given in step two. Table 1 shows combined number, means and SDs of total sample as well as its break-up in the first and second instalments. The combined subjects of the two instalments were arranged score-wise, starting from the most ascendant to the most submissive. The score range was from +21 to -18 for boys and +19 to -22 for girls. Figures 1 and 2 (page 36) depict frequency distribution of ascendancy-submission scores.

TABLE 1
N, M, σ , σ_M , $M_1 \sim M_2$, $\sigma_1 \sim \sigma_2$, σ_D AND $\sigma_D \sigma$ FOR BOYS AND GIRLS

	BOYS			GIRLS		
	First Sample	Second Sample	Combined Sample	First Sample	Second Sample	Combined Sample
N	207	202	409	202	200	402
M	0.26	-0.69	-0.21	0.06	-0.16	0.00
σ	7.86	7.05	7.49	7.59	7.98	7.79
σ_M			0.37			0.39
$M_1 \sim M_2$			0.95			0.22
$\sigma_1 \sim \sigma_2$			0.81			0.39
σ_D			0.75			0.77
$\sigma_D \sigma$			0.52			0.54

The difference between means ($M_1 \sim M_2$) and the difference between standard deviations ($\sigma_1 \sim \sigma_2$) was calculated through critical ratio. The

CR values 1.29 (boys) and 1.55 (girls) both turned out to be less than 1.96 and hence insignificant at 0.05 level. It can, therefore, be concluded that the scale satisfies the criteria of internal consistency.

The split-half method with even and odd serial numbers of items was employed to measure reliability using Spearman-Brown prophecy formula. The reliability coefficient was found to be 0.81 in the case of boys and 0.83 in the case of girls.

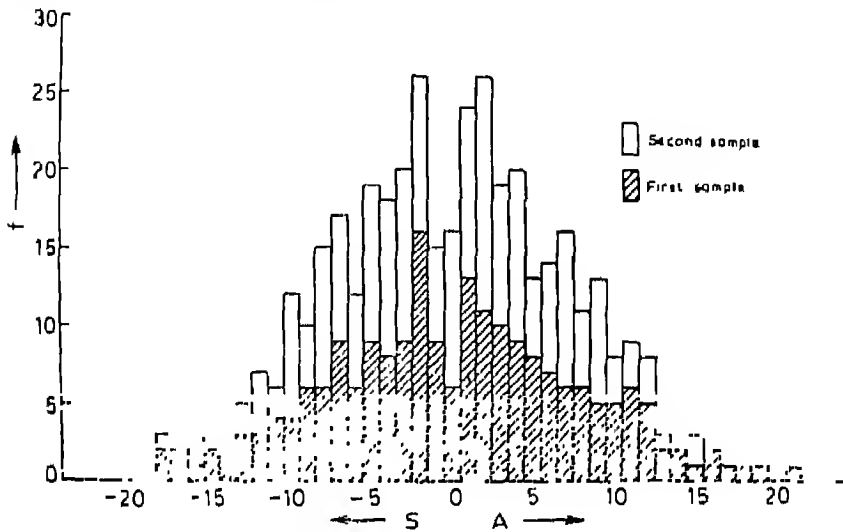


Fig .1 Graph showing frequency (f) against ascendance (A) submission (S) score values (Boys)

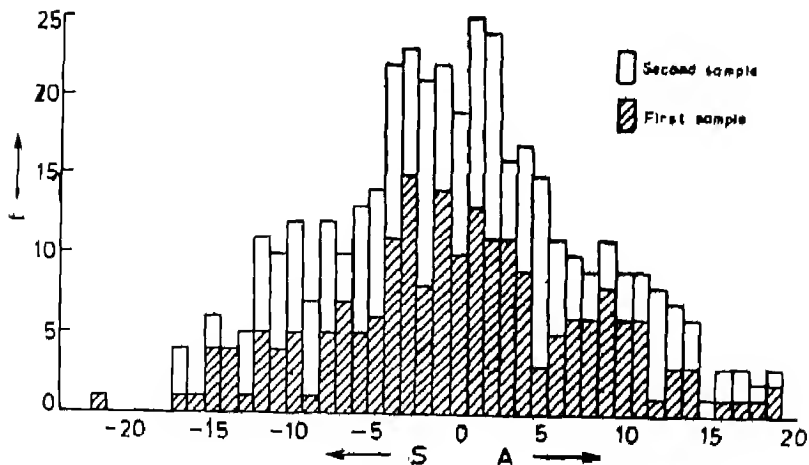


Fig .2 Graph showing frequency (f) against ascendance (A) submission (S) score values (Girls)

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Figures 1 and 2 indicate that the frequency distribution of ascendance-submission scores is more or less normal. This was confirmed by applying the chi-square test. For this purpose the subjects were divided into five categories on the basis of scores -

1. A_2 Highly ascendant scoring 14 and above
2. A_1 Moderately ascendant scoring 5 to 13
3. A_0 Average „ 4 to -4
4. A_{-1} Moderately submissive „ - 5 to -13
5. A_{-2} Highly submissive „ -14 and below.

TABLE 2
OBSERVED FREQUENCY (f_o) AND EXPECTED FREQUENCY (Fe)
ACCORDING TO HYPOTHESIS OF NORMAL DISTRIBUTION

		A_2	A_1	A_0	A_{-1}	A_{-2}
Boys	f_o	12	95	184	103	13
	f_e	14.7	97.5	184.6	97.5	14.7
Girls	f_o	18	89	187	92	16
	f_e	14.6	96.6	183.6	96.6	14.6

The values of χ^2 are as follows :

$$\text{Boys : } \chi^2 = \frac{(f_o - f_e)^2}{f_e} = 0.876$$

$$df = 4 \text{ hence } P > 0.90$$

$$\text{Girls : } \chi^2 = 1.673$$

$$df = 4 \text{ hence } 0.72 < P < 0.80$$

Thus χ^2 is insignificant in both the cases and there is hardly any divergence between the observed and expected frequencies on the hypothesis of normal distribution, i.e. the trait of ascendance-submission is normally distributed in the population.

The values of skewness (SK) and Kurtosis (Ku) are as follows :

$$SK = \frac{X^3/N}{3}, Ku = \frac{X^4/N}{4} - 3 \quad (\text{Ghiselli 1954})$$

	Boys	Girls
N	409	402
ΣX^3	-9665	10.262
σ^3	420.34	465.77
ΣX^4	3225929	3664884
σ^4	3149.45	3617.01
SK	0.06	0.05
KU	-0.50	-0.48

The negligible values of SK in boys and girls show that the distribution of ascendance-submission is almost symmetrical. The small negative value of KU indicates that for both the sexes the distribution is only slightly platykurtic. Hence ascendance-submission can safely be taken as normally distributed.

5. Test-Retest

Finally the reliability of the scale was found by test-retest method. Respective forms were administered to 43 boys and 45 girls chosen from the samples of third and fourth steps. The retest data were collected after a gap of six weeks. The details are as follows :

	Boys	Girls
N	43	45
ΣX	71	36
ΣY	106	-50
ΣX^2	2792	3546
ΣY^2	3072	3824
ΣXY	2401	2586

The reliability coefficient (r) was calculated as follows .

$$r = \frac{N \Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{[N \Sigma X^2 - (\Sigma X)^2][N \Sigma Y^2 - (\Sigma Y)^2]}}$$

Boys = 0.81, Girls = 0.72.

Thus the scale has quite high reliability coefficient.

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Economics of Non-Formal Education

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✓ **T**HOUGH education has both consumption and investment components, it is predominantly an investment. There has been, of late, a burgeoning interest among economists and educational policy-makers in education as a potential causative determinant of socio-economic development. Investment in labour and capital, in its conventional concept, fails to explain some of the significant aspects of the complex multi-dimensional process of development. Investment in 'human capital', as endorsed by empirical evidences, substantially contributes to the quality of labour and capital which, in turn, boosts up their productivity (Aukrust, Beckerman, Denison, Parnes, Schultz and Vaizey). As a basic and crucial input in the development process, education has everywhere, ✓ in the developed and developing countries, evoked 'novel enthusiasm' and surging interests.

Any investment decision, be it private or public, whether in physical inputs or in men and women, inherently takes into account the probable flow of returns from it. Legitimately, therefore, 'investment in men' is, tacitly or overtly, weighed against the two criteria of its effectiveness: internal efficiency and external productivity. The need for judicious investment and efficient resource management in education is reinforced by;

- ✓
- (I) acute scarcity of resources;
 - (II) competing claims of other sectors of economy over limited resources;

learning environment at home, reducing incidence of truancy and drop-outs; investment interest in education; concern for academic excellence, etc. Besides this education/literacy increase the value of women's contribution to non-monetary family income, by improving the quality of her child-care services, and increasing her powers of discrimination as a consumer, and thus increasing the utility which the family derives from a given monetary income (Woodhall 1973). Weisbrod (1964) has pointed out that informal education in the home ought to be included as one of the external or 'spill over' benefits of investment in education.

Non-formal education will go a long way in providing a viable alternative to the formal system, which especially in the Indian context, stresses the need for larger investment in human resources than 'physical' investment.

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Isolation Effects in Verbal Learning

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This article reviews the properties and characteristics of the isolation effect in the verbal learning phenomena, viz. serial learning, paired-associate learning, extended serial learning and free recall. A number of theoretical interpretations and models have been suggested to explain the isolation effect. The isolated item is facilitated in learning is the consistent finding in all the researches but there is a disagreement regarding its effects on total list learning, its spread to the adjacent items and its magnitude. The isolation effects have been investigated quite extensively with the isolated verbal material, for example, nonsense syllables, numbers and meaningful words, very little work has been done so far with the connected discourse. The variables like intelligence, anxiety and field dependence-independence affect the isolation effect in verbal learning. Finally, the educational implications of the isolation effects have been pointed out.

VERBAL learning has occupied a central position in the research and the theoretical activities of psychology ever since the pioneering studies of Ebbinghaus (1885). Prior to 1950s and during the major theoretical controversies between the S-S and S-R or between contiguity and reinforcement, verbal learning was either completely ignored or just taken for granted in the naive belief that principles or simple animal learning could be automatically extrapolated to complex processes of concept formation, language learning, etc. However, it was soon realized that Watson's claim that once simple conditioning is understood, all complex human behaviour could be successfully explained could not stand at its face value.

Verbal learning started becoming respectable in the fifties. The early literature on verbal learning was reviewed by McGeoch (1942) in

his classic book, *The Psychology of Human Learning*. A second edition of this book by McGeoch and Irion (1952) incorporated the theoretical and empirical developments relevant to human learning in general but devoted to verbal learning, that occurred during the period 1942-1950. After a gap of about 15 years some more books, viz. *Reading in Verbal Learning* by Kausler (1966), *Verbal Learning* by John Jong (1968), *Verbal Learning and Memory* edited by Postman Keppel (1969), *Verbal Learning and Retention* by Hall (1971) appeared in this field summarizing the researches and new currents. Kausler's *Verbal Learning and Memory* published in 1974 is the last and comprehensive book which encompasses almost all the topics which could be covered in this field.

A large amount of contemporary research has reflected a trend toward the analysis of verbal learning tasks. There are four major methods or procedures that are used in the experimental laboratory to study the phenomena and processes of interest: serial learning, paired associate learning, extended serial learning and free recall. These are the names of the major tasks which are employed, although there are, of course, variants of each. Hermann Ebbinghaus (1885)¹ initiated his experiments on serial learning. He and the later researchers advanced 'bowness' and 'skewness' as the two salient features of the serial position curve. However, as Feigenbaum and Simon (1962) have pointed out, there are ways of distorting the shape of the serial position curve. If one item is made clearly distinct from other items it will be learned much faster or if half the list is coloured and the other half black, the curve shows a large decrease in errors on the last item of the red half of the list and the first item of the black half. This had long been realized by von Restorff (1933) and is known as the von Restorff effect. Wallace (1965) examined the theoretical and empirical properties of the von Restorff phenomenon and suggested some explanations of the isolation effect.

Von Restorff in 1933² conducted a series of studies and concluded that isolating an item against a crowded or homogeneous background facilitates the learning of that isolated item. In her experiment she used in the list of 10 items nine numbers and one syllable or nine syllables and one number. The isolated member (a syllable in the list of numbers or a number in the list of syllables) in the list showed higher recall scores. Von Restorff used both the paired associate method and the free recall method and demonstrated that the member which stands out against a homogeneous background, irrespective of its class,

¹Information obtained from McGeoch (1942)

²Information obtained from Koffka (1935)

is learned more easily. The results were interpreted within a gestalt theoretical framework and gave impetus to further exploration of the isolation phenomenon. Even before von Restorff's experiments, several studies dealing with the influence of vividness upon learning (Calkins 1894, 1896, Jersild 1929, van Buskirk 1932) were done in which certain elements were isolated by making them more vivid than others. Although all these studies have dealt with the vividness-isolation problems and described the isolation effect, none has tried to explain why an item in isolation is more readily learnt. It was von Restorff who attempted the explanation of this phenomenon within a gestalt theoretical framework using the concept of neural trace. Each item in a list sets up a neural trace. The neural trace of the isolated item stands out as the 'figure' against the aggregated homogeneous neural traces, the 'ground' because of its distinctness and, therefore, is better retained.

There are five major ways isolation has been manipulated. One way involves performing an additional operation on the item, e.g. printing it black or increasing the size of the letters of the item or enclosing it by circle or rectangle, or writing the critical item on a coloured background. Any one of the items in the list may be isolated by one of the suggested operations and is generally compared with itself in a non-isolated condition (when all items are typed alike). The experimenter has maximum control over this manipulation of isolation by colour or size or encircling. The isolation may be produced in a second way through direct manipulation of the items, that is, inserting a different type of item within a list of items, e.g. nonsense syllable among meaningful words or numbers or a meaningful word or number among the nonsense syllables. In comparing the isolated term with the same item in a non-isolated condition, the control list must be constructed of items of the same material type as the isolated terms. One must be careful to insure that adequate controls are present as isolation effects may be confounded with differences in ease of learning the different material types. A third way isolation has been manipulated, is through structural organization within a list. The structural method was developed by Siegel (1943) to reduce intraserial interference differences between massed and isolated items. Isolation is produced by embedding an item of one type within a series of items of the other type. A massed item is one preceded by terms from the same element type. The structural technique involves within subject comparisons, as each subject has both isolated and massed material. The major problem with this method is that the isolated and massed terms are not identical, thus comparisons

may be influenced by intrinsic properties of the items. The fourth way isolation has been manipulated by changing the relationship between the stimulus and response of each critical pair. The relational isolation was used by Erickson (1963). In the paired-associate task that he used, the list consisted of eight pairs of items of consonant syllable and a number while the critical pair in the list is isolated because both the stimulus and response are consonant syllables. The limitation of this method is that it can only be used with paired associate task and not in a serial learning where stimulus and response terms are not clearly defined. The fifth way of isolating the item is through the change in direction of presentation of items. Gabassi (1976) moved all the digrams in the list of 12 from left to right on the screen but the seventh item was moved from right to left.

Properties and Characteristics of the Isolation Effect

We have seen so far that the isolation effect has been supported by a number of studies. The isolation effect does not limit itself to the isolated item but it may have its effect on the learning of the entire list or on the learning of the adjacent items. Similarly the different methods of isolation cited earlier may have different influence on the isolation effect. One may, therefore, inquire as to what other phenomena are associated with isolation.

(a) Influence on Isolation of Serial Learning

There has been no consistent finding dealing directly or indirectly with the von Restorff phenomenon which would suggest that isolation enhances overall list learning. Isolated list was better learned is supported by three studies (Young and Supa 1941, Smith and Stearns 1949, Cimbalo and Peltonen 1970). Cimbalo *et al.* explain this result in terms of the presence of an isolated item. Most studies have demonstrated that the isolated list when compared to the control list does not enjoy any superiority in overall learning (Bhatnagar and Sen 1972, Deshpande and Aljapurkar 1972, Jensen 1962, Newman and Saltz 1958, Roberts 1962, Smith 1949). It seems that the advantage accruing to an isolated item is obtained at the expense of other items in the list.

(b) Learning and Retention of the Isolated Item

The isolated item is learned more rapidly and to a higher degree than its corresponding control item, has been reported by several investigators (Bhatnagar and Sen 1972, Buxton and Newman 1940, Jones and Jones 1942, Kothurkar 1956, Van Buskirk 1932). Postman and Phillips (1954) demonstrated slight evidence for better retention of isolated after a 20-minute interval. Saul and Osgood (1950) in a situation similar to Postman and Phillips', could demonstrate no such effect after a 24-hour delay. Green (1956) also failed to show that the isolated terms increased their advantage over the massed terms during the delay interval. An attempt to make comparisons on the retention of the isolated items is confounded by differences in degree of learning. The appropriate experiment on the isolation retention issue has not been conducted. Therefore, the results are negative. In fact, there is suggestive evidence that the contrary is true.

(c) Spread of the Isolation Effect in Serial Learning

The effect of isolating an item on learning the immediately adjacent terms has attracted the attention of many a researcher. In the studies of Jones and Jones (1942) and Smith (1948) using the isolation by colour technique the learning of the item on the either side of the isolated item was slightly facilitated. A subsequent study by Smith (1949) failed to replicate this finding and Smith and Stearns (1949) found a slight advantage for the item that followed the isolated term but not for the item that preceded it. The spread of isolation was studied by Jenkins and Postman (1949) and Tatuno (1961) using the isolation by material technique. In the study of Jenkins and Postman, performance on the item immediately following the critical item was significantly better in the control list. The item preceding the critical (isolated) item was also learned better in the control list than in the isolated but the difference was short of statistical significance. To account for their results Jenkins and Postman suggested that isolation attracts attention to the particular isolated item. Attention leads to increased rehearsal time for succeeding items. Tatuno was unable to demonstrate consistent spread effects, there did appear to be a slightly inhibitive spread of the isolation effect to succeeding items. Several serial learning studies had compared the performance on the term immediately following the critical (isolated) or control item but the differences in speed of learning the

item which follows the critical terms have not been demonstrated (e.g. Jensen 1962, Roberts 1962).

Any definite conclusion as to the spread of the isolation effect cannot be reached at present. There has been little evidence of enhancement of the immediately adjacent terms when isolation was produced by substituting a different kind of material in the list. There has been some facilitation, though, when the isolation was produced by printing one term in a different colour. Perhaps the spread of isolation is related to task relevance of the isolated material as discussed by Postman and Philips (1954) and Koyanagi (1957). One might speculate that task-relevant isolation is more distracting and leads to more active rehearsal of the isolated term. Irrelevant isolation may not produce the same disruption of rehearsal time since the subjects are not required to learn the colour.

(d) Comparison of the Methods of Isolation (by Colour or Size and Isolation by Material)

Isolation by colour and isolation by material have been used in many studies measuring the isolation effect (Bhatnagar and Sen 1972, Deshpande and Aljapurkar 1972, 1975, Jenkins and Postman 1948, Jones and Jones 1942). The isolation effect was more pronounced in the former method, i.e. when the middle item of the list was of a different colour against a homogeneous background of black items than the latter method when isolated item was a different type of material. In the isolation by colour technique the item remains the same as in the control list but in the isolation by material technique the isolated item differs from that of the corresponding item in the control list and, therefore, additional effort is needed on the part of the subject to learn the isolated item in this technique. So the magnitude of isolation effect is reduced.

(e) Ease of Learning and Degree and Temporal Position of Isolation

A direct relationship between degree of isolation and speed of learning was presented in the original von Restorff paper (Koffka 1935). Pillsbury and Raush (1943) extended the number of isolated items from one to three to investigate how decreasing the degree of isolation would affect recall. The isolated material maintained a clear advantage over the massed material but it was gradually reduced as the number of isolated items increased. Other investigators (Erickson 1963, Huang, I-ning and Hynum 1970, Kimball and Dufort 1966, Moore 1955, Saltz

and Newman 1960) also reported the proposition that ease of learning of isolated item is directly related to the degree to which that item is isolated. The research findings of the studies (Bhatnagar and Sen 1973, Cimbalo 1978, McLaughlin 1966) concerning the isolation effect have shown that when attention getting items are placed in the middle of the list of items, the enhanced performance on the isolate is obtained at the expense of the other items of the list.

(f) Background Meaningfulness

The terms background meaningfulness imply the meaningfulness(m) of the homogeneous items in the list. The magnitude of the isolation effect varying as a function of the background meaningfulness has received some attention. Rosen, Richardson and Saltz (1962) compared the serial learning effects of an item typed in red among eight items of equal meaningfulness typed in black. The results revealed that isolation enhanced learning and the enhancement was greater in the low meaningful list. Kothurkar (1956) reported an advantage in free recall for the isolated numbers against the prose background, but it was not nearly as large as the advantage the isolated numbers had against the background of nonsense syllables. Deshpande and Aljapurkar (1972) also obtained more pronounced isolation effect in the list of nonsense syllables than in the list of meaningful words. The explanation suggested was that isolation facilitated learning by making the item more easily differentiated. In the high meaningful list increased differentiation was relatively unimportant addition since item differentiation was already high. However, some findings contrary to the above were reported by Johnson (1971) Recall of the embedded syllable was best when the background lists were of higher m. Since a poorly differentiated list of low-m syllables would have considerably intra-syllable interference, a low-m isolate might be facilitated by placement into a list of highly differentiated syllables of high-m. A high-m isolate, however, would gain relatively little by being removed from a well differentiated list of high meaningful items. The studies to date have not been consistent in demonstrating that the magnitude of the isolation effect decreases as a function of increasing background meaningfulness.

Isolation Effect in Paired-Associate Learning

The paired-associate learning situation clearly identifies the stimulus

and the response and this task has been used frequently to examine varying aspects of the isolation effect. Erickson (1963) used the paired-associate task to demonstrate that the isolation effect does not need to be related to the structural or absolute qualities of the material but can operate with relationship as well. Results of his study indicated that relational isolation facilitated the learning of the critical items.

Whether the isolation effect manifests itself on the stimulus or on the response side of the pair was a major concern to a number of investigators. Kimble and Dnfort (1955) observed the isolation effect when the isolated unit was used as a stimulus but not as a response. Questions have been raised regarding their experimental material as well as interpretation of their data.

Nachmias, Gleitman and McKenna (1961) and Erickson (1965, 1968) have indicated that isolation effects can be obtained when the isolated item is placed on either the stimulus or the response side although there is some disagreement as to whether similar or differential effects are obtained. In the Nachmias, Gleitman and McKenna study isolation effects obtained on both the stimulus and response sides were found to be about equal. Erickson (1965) found that although the isolation of either a stimulus item alone or a response item alone can facilitate learning, the isolation of the stimulus item produces the greater effect. In addition, the advantage of stimulus over response isolation is not contingent upon the longer exposure time for stimulus items characteristics of the usual paired-associate procedure. A study by Erickson (1968) supported these results. The dissimilar findings in Nachmias, *et al.* study and Erickson's study was due to the difference in the methods of isolating the material in the two studies.

Newman (1962) compared stimulus and response isolation produced by colour or by meaningfulness. The results of his experiments suggested that when the stimulus term was isolated performance was facilitated. However, when the response term was isolated, performance was facilitated if the isolation was produced with colour and not when it was produced with meaningfulness.

The von Restorff Effect on Extended Serial Learning

Although the von Restorff effect has been investigated extensively, this phenomenon has been given comparatively little attention when considered in relation to the learning of connected material. Smart and

Bruning (1973) used underlining as a means of isolating material and applied it to prose material. They had five groups—four experimental and one control—with 30 Ss in each. A passage of 700 words containing a number of facts was given to the Ss to read for 10 minutes. A 30-item multiple choice test was written on the material in the passage. No underlining was done by E or S for the control group but for the two experimental groups relevant underlining was done by E (ER) and by S (SR) and for the other two experimental groups irrelevant underlining was made by E (EI) and by S (SI). Performance was better of ER and SR groups than of EI and SI groups. ER and EI showed higher performance than SR and SI groups. SR, ER and EI groups differed significantly from SI group but did not differ from each other. SR and ER differed significantly from the control group and its performance was between EI and SI groups but not significantly different.

Holen and Oaster (1976) used a meaningful discourse stimulus material in a classroom lecture. Two counter-balanced forms of tape-recorded lecture resulted in significant serial position effect and isolation effects favouring initial over middle and final material, final over middle material and isolated over non-isolated material.

The von Restorff Effect in Free Recall

Bruce and Gaines (1976) showed that the isolation of four unrelated words in a list produced recall, clustering and recognition phenomena which were qualitatively similar to those for four categorically related words. In yet another study on free recall (I-Ning-Huang (1976) no reliable and systematic spread effect was obtained for the items immediately preceding and following the isolate, however, a positive spread effect occurred concurrently with isolation effect in the reconstruction method. The isolation effect was found to be a function of the serial position, the effect was greater at the central positions than at the peripherals in free recall and this trend was reversed in the reconstruction method. Bellezza and Cheney (1973) showed that the recall depends on the serial position of the isolated item and the condition under which it was recalled. Under delayed recall condition where items were removed from the short-term store (STS) by the interpolated task, recall of the isolated items was no better than recall of the control items. Under immediate recall, however, the isolated items were certain to be recalled because they were almost certain to be in STS.

The von Restorff Effect in Short-term Memory

Lively (1972) used a probe technique to investigate the von Restorff effect in short-term memory. Isolation was produced at different positions by embedding consonants among digits and digits among consonants. Contrary to the established findings, the isolated item was not recalled with greater frequency than the control item and performance on items other than the isolated item and its immediately following item was not superior to comparable portion of control lists.

Cimbalo, *et al.* (1970) manipulated the duration of techistoscopic exposure (2.5, 10 and 20 seconds) in an attempt to emphasize either short-term memory (STM) or long-term memory (LTM). The duration \times isolation interaction was hypothesized such that overall performance for isolated and non-isolated lists would not differ in STM but performance for isolated lists would be superior to non-isolated lists in LTM. Results did not support the hypothesis. Performance for the isolated lists was found to be superior for all the three duration conditions. In his later studies (1977) he found the overall list facilitation in short-term memory when the isolated item was centrally located in the list and when the list items were simultaneously presented.

Intelligence and Isolation Effect

The experiments cited before were carried out with normal subjects. The von Restorff phenomenon has also been studied among the mentally retarded subjects. McManis (1966) studied the effect by comparing normal and retarded subjects and found a greater isolation effect (using red isolated item in the black homogeneous items) with high meaningful than with low meaningful lists in both the groups of subjects. Sternlicht and Deutsch (1966) also demonstrated the von Restorff effect by inserting a different kind of material within a list of homogeneous items (i.e. inserting numbers among nonsense syllables and vice versa). Their results suggested a similarity in memory patterns among normals and mental retardates. Neither of these experiments investigated the effect of isolation on the learning of the entire list. Sen, *et al.* (1968) conducted the experiments on the severe mental retardates in which the degree of isolation and the placement of the isolated item in the list was varied. Their results revealed that serial learning was facilitated by the placement of the powerfully isolated items in the middle of the list but less powerfully

isolated items at the same position enhanced the learning of those items but did not facilitate the overall learning of the list.

Anxiety and Isolation Effect

The differential performance of high anxious (HA) and low anxious (LA) subjects can be predicted from Taylor-Spence theory. The HA Ss are expected to be superior to LS Ss throughout learning under conditions where the correct response is dominant. With the reverse situation where incorrect responses are initially dominant the performance of HA Ss would be predicted to be initially inferior to LA Ss followed by superior performance of HA Ss at the point in learning where correct responses attain prominence in the response hierarchy. These predictions imply an interaction between level of performance and anxiety level in complex learning tasks involving initially strong competing responses.

Tobias (1979) has suggested that the procedures which provide memory support will aid the HA subjects in their performance. Isolating the middle item by some mechanism in the serial list will provide an additional anchor to the learner besides the end items as anchors. It can be predicted from this that the HA will get more advantage of the item isolation as compared to LA. Deshpande (1976) observed significant isolation effect in serial list learning and also an anxiety \times meaningfulness \times isolation interaction. Anxiety \times meaningfulness effects were compared at different levels of isolation (no isolation vs. isolation). Anxiety \times meaningfulness interaction was found significant at no isolation level (control condition) but not significant at the isolation level (experimental condition). The LA Ss were better in performance in learning the serial list of nonsense syllables under the control condition than the HA Ss. The non-significant A \times M interaction under the experimental condition is because of the reduction in interference due to the presence of an isolated item in the case of HA Ss in the middle of the list where competition effects are stronger thus disrupting their performance. HA Ss are, therefore, more facilitated in learning the isolated list catching up the LA Ss in their performance.

Another important finding of his study was that the isolated item was learned more rapidly than its corresponding control item and this effect was more pronounced in HA Ss. Both the findings of the study support Tobias' contention.

Field Dependence-Independence and Isolation Effect

Field dependence-independence derives its name from the tendency for some people to be influenced more than others by the context (field) in which a perceptual judgement has to be made. Field dependent (FD) people differ in how they attend to and organize the stimuli contained within a perceptual field.

Alovisetti (1976) predicted that the effects of perceptual isolation on recall would differ for FI and FD subjects. An experimental and control list of 13 nonsense syllables with a single isolated item and corresponding critical item were presented. Significant facilitation of recall for the isolated item was found for both FD and FI. No support was found for the prediction that FD Ss would be facilitated in recall of the isolated item present. However, as predicted, FD Ss were inhibited in non-recall of the non-isolated items.

Interpretations of the von Restorff Phenomenon

1. *Common Sense Theory*

This theory states that the isolation effect occurs because the subject 'notices' that one item in the list is different from the rest.

2. *Surprise, Novelty and Attention*

Green (1956) suggested that it was not the perceptual conditions which produced better recall but rather it was the 'surprise' aroused by being unexpectedly presented with a different type of item. The first isolated item will have greater 'surprise value' than the subsequent isolated items. Green revised his thinking on the von Restorff phenomenon (1958) and offered the possibility that 'attention getting value' of the structural change within a list was responsible for the better recall of the isolated term. Berlyne's view of the von Restorff phenomenon is that by introducing novelty into the stimulus situation the arousal level of subjects will be increased resulting in a generally more efficient performance.

3. *Organizing Influence of Isolation*

Organization exerts an important influence on the learning process.

It has been suggested that the principle benefit of manipulated isolation is in the serial organization of the list (Smith 1949, Smith and Stearns 1949). The learning curves of a non-isolated and an isolated list suggested that superiority of learning the list was greater in the later stages of learning. The red item aids in establishing order, hence an advantage for the isolated list late in learning.

Gleitman and Gillett (1957) claim that part of the von Restorff effect is due to subjects' deliberate attempts to organize the material. Jensen (1962) has shown that learning items in a serial list is not affected by isolation, but order of learning those items is affected. However, the organizing aid of the isolated item is quite specific to that item.

Both attention and organization are relatively unrefined concepts as they are used in explaining the von Restorff phenomenon. The proponents of each position do not elaborate on why such factors would lead to more rapid learning.

4. *Selective Rehearsal of the Isolated Item*

One explanation of the isolation effect is that the subject selectively rehearses the isolated items more and rehearses the other items in the list less. The degree of rehearsal of an item is dependent both on its serial position and on its isolation. The probability of recall of an item will also be dependent on its serial position and isolation. More specifically (a) Isolated items which appear at the beginning of each list should be recalled with a higher probability than the corresponding control items. This is because selective rehearsal will lead to a higher probability of being coded into long-term store (LTS); (b) Isolated items in the middle of the list will also be recalled with a higher probability than corresponding control items. Again this is because selective rehearsal will lead to a higher probability of being coded into LTS; (c) Isolated items appearing very late in the list will not reside in short-term store (STS) long enough to be selectively rehearsed and coded into LTS.

Using selective rehearsal to explain the isolation effect has not yet accounted for all the facets of the isolation effect. However, the hypothesis does show how different measures of the effect such as recall of adjacent items and isolated items and total recall can be related to one another and also to experimental manipulations which include the serial position of the isolated item and the conditions under which it is recalled.

5. *Gestalt Explanation of the Isolation Effect*

Von Restorff (1933) interpreted her results by the gestalt theoretical framework. The neural trace was the construct employed to explain isolation. The trace of the isolated item becomes the 'figure' which stands out against the aggregated homogeneous traces, the 'ground'.

6. *Interference Explanation of the Isolation Effect*

Gibson (1942) suggests that generalization occurs between the items of a list and consequently, differentiation of the item is an important feature of verbal learning. Gibson made use of the concept of interference and competing responses to generate von Restorff's results. Isolation aids discrimination and learning because it reduces interference from the other items of the list.

7. *Mediation Theory*

Erickson's (1963) results can be reconciled with interference theory if one adds a mediational construct to the stimulus and response generalization theory of intralist interference. He hypothesized that the differentiation occurred at the level of the mediating responses, without specifying the exact nature of these responses. When a trigram-trigram pair is inserted in a list of trigrams as stimuli and numbers as responses or numbers as stimuli and trigrams as responses, increased differentiation and reduced generalization may occur at the mediational level facilitating the performance on the isolation pair, increasing isolation by adding colour may have made the mediating response more discriminable or increased the probability of its occurrence or both.

8. *Two-Stage Theory of Verbal Learning*

It has been suggested that isolation in serial learning tasks can be explained in terms of a two-stage theory of verbal learning. Horowitz (1960) suggested that the isolation effect appeared chiefly as a result of its influence on the associative stage, Saltz and Newman (1959) suggested that the facilitative effect of isolation occurs mainly during response learning. They applied their analysis to an early stage in learning and

recognized that as learning progresses, isolation may exert an influence through the associative stage.

9. *Information Processing Theory of Serial Learning*

An exact definition of information processing (IP) theory is difficult to formulate. The fundamental premise is that learning consists of establishing elementary processes for manipulating symbols. In general, an encoded stimulus is treated as a set of information carrying components. IP models did not evolve directly from the concepts and language of classical learning theory. The most direct antecedent of current models was the post-World War II genesis of communication theory, particularly through the introduction of information measurement concepts by Shannon (1948), the research on speech recognition by Cherry (1953) and the formal model for selective perception by Broadbent (1958). Memory components were then added by a number of psychologists during the 1960s (e.g. Atkinson and Shiffrin 1968, Feigenbaum 1963, Norman 1968, Waugh and Norman 1965).

The serial position effect and the isolation effect in serial verbal learning are primarily accounted by macro-processing system of the IP theory. One of the postulates of the IP theory is that the subject employs a relatively orderly and systematic method for organizing the learning task using items with features of uniqueness as anchor points. The subjects learning the syllables of a serial list will reduce the demands on memory by treating the ends of the list as 'anchor points' and by learning the syllables in an orderly sequence, starting from anchor points and working toward the middle. The information processing strategy for organizing the serial learning task using anchor points explains the primacy finality effect and the isolation effect. Making an item unique by colouring against all the homogeneous items in the list gives a status of an anchor to the coloured item and thereby facilitates its learning. It also explains the spread of isolation to the adjacent items.

The von Restorff phenomenon remains a controversial one at the theoretical level. No single theory can explain it adequately. The interpretation of this phenomenon will depend upon the task (serial, paired-associate or free learning), and the method of manipulating isolation (task-relevant versus task-irrelevant isolation and isolation by colour versus isolation by material), intelligence and personality.

Isolation Effect : Educational Implications

Bruce and Gaines (1976) proposed that a perceptually distinctive word is more often recalled because it is maintained in and retrieved from an accessible isolation mnemonic unit. Since the learning and recall of the isolated items is always facilitated than the non-isolated items the effective methods of isolating the material could be successfully used for encoding the material through anchoring.

Klare, Marby and Gustafson (reported in Smart and Bruning 1973) noted in their study that if S had a high aptitude for the material, there was no difference between relevant and random underlining, if he had low aptitude, his performance declined under the random condition. An examination of the used textbooks shows that students isolate material by various means but the relative efficacy of these has not been established.

Marking in textbooks is a common practice. The implications of an interaction between aptitude for the material and relevancy of underlining are crucial for the majority of students. To quote Smart and Bruning (1973) .

A student who dislikes or is relatively low in his ability in a particular subject area would be well advised not to underline his books and also not to purchase used marked texts since he may be severely damaging his chances of doing well.

The possibility that the effect of isolating interacts with other variables like personality, suggests a need for more research. If the high anxious students while learning a complex task are given memory support through isolating some material, their performance would be improved. How the isolation effect manifests itself in different contexts, with different age-groups, with groups of varying ability and intelligence are some of the problems the educational psychologists can take up. An examination of how this phenomenon maintains itself across time and numerous other factors such as motivation, personality and type of material would be most beneficial for those interested in the learning process.

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Adjustment Problems of College Students Preparing for Four Selected Professions

A Comparative Study

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DURING the last decades educationists, psychologists and social workers have realized the importance of systematically studying various aspects of the student's life and need for the extent of guidance to youth. An essential aspect of understanding of an individual student is to know the problems, worries, fears and anxieties which immediately and really occupy his mind and hinder him from doing whatever he is supposed to do at the moment. There are several specific problems which the youth of our country face. Some problems seem common to many college students and campuses. Difficulties in studying, interest and purpose in college work, and in hitting upon a suitable vocational goal are frequent complaints of students. Besides this there are several conditions, i.e. family and social setting, emotional needs, vocational and educational setting that may create many problems which require adjustment.

Now a days there is a great rush in the professional colleges. In spite of the selective admissions there are still failures, drop-outs and wastage. The real value of professional education must be sought in the

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success of a professional student as a specialist. The problem of predicting student success in professional education is possible only when the adjustment problems of these students are discovered and they are minimized. There is considerable dearth of research attempting to discover the adjustment problems of professional college students. The present study was undertaken to explore and compare the adjustment problems in different areas of adjustment of four groups of professional students.

The Concept of Adjustment

Adjustment is a continual process by which a person varies his behaviour to produce a more harmonious relationship between himself and his environment. The direction of his effort may be toward modifying his own behaviour and attitudes toward changing the environment or both. For the purpose of this study adjustment has been defined as a satisfactory relationship between the individual and the environment in respect of the five areas of adjustment, i.e. home, health, social, emotional and educational. The adjustment in these areas has been understood in terms of adjustment problems faced by the subjects in these areas.

Objectives

The main objectives of the present study were :

1. To explore the adjustment problems of professional (law, teacher training (B.Ed.), medical and engineering students.
2. To compare the adjustment problems in different areas of adjustment between these four groups.
3. To offer suggestions regarding the better adjustment of the pupils in the different areas of adjustment.

Hypotheses

Underlying the plan of the present study the following hypotheses were formulated and tested :

1. There will be significant difference in adjustment problems between engineering and medical students.
2. There will be significant difference in adjustment problems between engineering and teacher-training students.
3. There will be significant difference in adjustment problems between engineering and law students.
4. There will be significant difference in adjustment problems between medical and teacher-training students.
5. There will be significant difference in adjustment problems between medical and law students.
6. There will be significant difference in adjustment problems between teacher-training and law students.

Methodology and Data Collection

Sample

The sample of the study consisted of 520 students of professional colleges (law, teacher training (B. Ed.), medical and engineering) from three institutions of Meerut University and engineering students from Roorkee University. The normative survey method of research was followed.

Procedure

After selection of the sample the adjustment inventory for college students (A.K.P. Sinha and R.P. Singh) was administered on 520 professional students. The response sheets of adjustment inventory were scored out with the help of an answer-key. The subjects were classified in scoring of each area, i.e. home, health, social, emotional, and educational. The obtained data were organized in tabular form for statistical analysis. The statistical analysis of the data was made by applying the *t*-test for testing the significance of difference at .05 and .01 level for the adjustment problems in the five areas within the groups.

Results and Discussion

The results have been presented in the following tables which show the values of means, SDs and *t*'s.

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TABLE 1
SIGNIFICANCE OF DIFFERENCE BETWEEN ENGINEERING AND
MEDICAL STUDENTS FOR ADJUSTMENT PROBLEMS

Areas	Engineering N=172		Medical N=130		df	t-value
	Mean	SD	Mean	SD		
1. Home	2.441	2.659	2.300	2.423	300	0.480
2. Health	2.941	2.155	3.276	2.169	300	1.332
3. Social	8.540	3.511	8.676	3.170	300	0.352
4. Emotional	11.604	5.095	12.407	4.852	300	1.393
5. Educational	6.313	3.385	6.661	3.429	300	0.878
Total	31.843	12.524	33.415	10.650	300	1.176

Table 1 shows that the *t*-values between engineering and medical students in home, health, social, emotional and educational areas were not significant even at .05 level of significance. The null-hypotheses were not rejected. The observed difference may be attributable to the chance factor alone. It may be stated that engineering and medical students have no significant difference in adjustment problems in these areas. Pal (1969) found similar results that no difference between the groups under consideration exists with respect of home, health, emotional and college adjustment. Hence the results of the above table indicate that there is no significant difference in the adjustment problems between these groups. Hence the first hypothesis is rejected.

TABLE 2
SIGNIFICANCE OF DIFFERENCE BETWEEN ENGINEERING AND
TEACHER TRAINING STUDENTS FOR ADJUSTMENT PROBLEMS

Areas	Engineering N=172		Teacher Training N=125		df	t-value
	Mean	SD	Mean	SD		
1. Home	2.441	2.659	3.712	3.154	295	3.658**
2. Health	2.941	2.155	3.856	2.606	295	3.208**
3. Social	8.540	3.511	7.952	2.858	295	1.588
4. Emotional	11.604	5.095	12.448	4.665	295	1.480
5. Educational	6.313	3.385	5.056	2.783	295	3.505**
Total	31.843	12.524	33.000	11.468	295	0.825

**Significant at .01 level

Table 2 reveals that *t*-values between engineering and teacher-training students in home and health areas were 3.658 and 3.208, respectively, with 295 degrees of freedom. These values were significant even at .01 level of significance. The null-hypotheses were rejected. The mean values of teacher-training students (3.712 and 3.856) in these areas were greater than engineering students (2.441 and 2.941) which indicate that teacher-training students have greater adjustment problems than engineering students in home and health areas. The table also reveals that the *t*-value between these groups in educational area was 3.505. The value was significant at .01 level of significance. The mean value of engineering students (6.313) in educational area was higher than the mean value of teacher-training students (5.056). It may be stated that engineering students have greater adjustment problems than teacher-training students in educational area. The table further reveals that the *t*-value between engineering and teacher-training students in social and emotional area was not found significant even at .05 level. This means that both these groups have no significant difference in their adjustment problems in social and emotional areas. Pal (1969) in his study found similar results on health area while on the social area the student-teachers were found to be significantly superior than engineering students. This finding is contradictory with the finding of the present study. Hence the second hypothesis is retained except social and emotional areas.

TABLE 3
SIGNIFICANCE OF DIFFERENCE BETWEEN ENGINEERING
AND LAW STUDENTS FOR ADJUSTMENT PROBLEMS

Areas	Engineering N=172		Law N=93		df	t value
	Mean	SD	Mean	SD		
1. Home	2.441	2.659	3.215	2.865	263	2.151*
2. Health	2.941	2.155	2.795	2.061	263	0.541
3. Social	8.540	3.511	7.258	2.828	263	3.228**
4. Emotional	11.604	5.095	11.225	4.448	263	0.628
5. Educational	6.313	3.385	5.118	2.560	263	3.227**
Total	31.843	12.524	29.397	10.779	263	1.663

*Significant at .05 level

**Significant at .01 level

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Table 3 indicates that the *t*-values (3.228 and 3.227) between engineering and law students in social and educational areas were significant even at .01 level. The null-hypotheses were not retained. The mean values of engineering students (8.540 and 6.313) in social and educational areas were greater than the mean values of law students (7.258 and 5.111). It may be interpreted that law students have better adjustment than the engineering students in social and educational areas. The *t*-value in home area (2.151) was found significant at .05 level of significance. The mean value of law students (3.215) was greater than the mean value of engineering students (2.442) in home area. This means that the law students have greater adjustment problems than engineering students in home area.

The *t*-values between engineering and law students in health and emotional areas (0.541 and 0.628), respectively, were not significant even at .05 level. It may be interpreted that the engineering and law students have no significant difference in their adjustment problems in health and emotional areas.

Pal (1969) in his study has also arrived at the similar results on home area. He found on comparison of different groups under consideration over grades of home adjustment that the engineering students were better placed than the law students over this distribution. Thus, the third hypothesis is partly accepted in respect of home, social and educational areas only.

TABLE 4
SIGNIFICANCE OF DIFFERENCE BETWEEN MEDICAL
AND TEACHER-TRAINING STUDENTS FOR ADJUST-
MENT PROBLEMS

Areas	Medical N=130		Teacher- training N=125		df	t-value
	Mean	SD	Mean	SD		
1. Home	2.300	2.423	3.712	3.154	253	3.997**
2. Health	3.276	2.169	3.856	2.606	253	1.927
3. Social	8.676	3.170	7.952	2.858	253	1.916
4. Emotional	12.407	4.852	12.448	4.665	253	0.068
5. Educational	6.661	3.429	5.056	2.783	253	4.111**
Total	33.415	10.650	33.000	11.468	252	0.299

**Significant at .01 level

It may be observed from Table 4 that the t -values between the medical and teacher-training students in home (3.997) and educational area, (4.111) were significant even at .01 level of significance. The null-hypotheses were rejected. The mean value of medical students (6.661) was higher than the teacher-training students (5.056) in educational area. The mean value of teacher-training students (3.712) was higher than mean value of medical students (2.300). It may be inferred that the medical students face more adjustment problems in educational area and teacher-training students face more adjustment problems in home area.

The t -values between these groups in health, social and emotional areas were not significant even at 0.5 level of significance. The difference may be attributable to chance factor alone. It means that medical and teacher-training students have no significant difference in their adjustment problems in these areas. Hence the fourth hypothesis is partly accepted in respect of home and educational areas of adjustment only.

TABLE 5
SIGNIFICANCE OF DIFFERENCE BETWEEN MEDICAL AND
LAW STUDENTS FOR ADJUSTMENT PROBLEMS

<i>Areas</i>	<i>Medical</i>		<i>Law</i>		<i>df</i>	<i>t-value</i>
	<i>N=130</i> <i>Mean</i>	<i>SD</i>	<i>N=93</i> <i>Mean</i>	<i>SD</i>		
1. Home	2.300	2.423	3.215	2.865	221	2.505*
2. Health	3.275	2.169	2.795	2.061	221	1.681
3. Social	8.676	3.170	7.258	2.828	221	3.509**
4. Emotional	12.407	4.852	11.225	4.448	221	1.883
5. Educational	6.661	3.429	5.118	2.560	221	3.846**
Total	33.415	10.650	29.397	10.779	221	2.758**

*Significant at .05 level

**Significant at .01 level

Table 5 shows that the t -values between medical and law students in social and educational areas (3.509 and 3.846) were significant even at .01 level. The null-hypotheses were rejected. The mean values of medical students in these areas (8.676 and 6.661) were greater than the mean values of law students (7.258 and 5.118). It indicates that medical students have more adjustment problems than law students in social and educational areas. The t -value (2.505) between these groups in home area was signi-

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ificant at .05 level. The mean value of law students (3.215) was greater than the mean value of medical students (2.300) in home area. It may be stated that the law students have more adjustment problems than the medical students in home area. The table further reveals that the *t*-values between medical and law students in health and emotional areas were not significant even at .05 level. It means that both groups have no significant difference in their adjustment problems in health and emotional areas.

The significant *t*-value (2.758) at .01 level for the total score of adjustment problems indicates that both groups have highly significant difference in their adjustment. Hence the fifth hypothesis is accepted.

TABLE 6
SIGNIFICANCE OF DIFFERENCE BETWEEN TEACHER-TRAINING AND
LAW STUDENTS FOR ADJUSTMENT PROBLEMS

Areas	Teacher-training N=125		Law N=93		df	t-value
	Mean	SD	Mean	SD		
1. Home	3.712	3.154	3.215	2.865	216	1.213
2. Health	3.856	2.606	2.795	2.061	216	3.355**
3. Social	7.952	2.858	7.258	2.828	216	1.783
4. Emotional	12.448	4.665	11.225	4.448	216	1.966*
5. Educational	5.056	2.783	5.118	2.560	216	0.170
Total	33.000	11.468	29.397	10.779	216	2.375*

*Significant at .05 level **Significant at .01 level

Table 6 reveals that the *t*-value (3.355) between teacher-training and law students in health area was significant even at .01 level. The null-hypothesis was rejected. The mean value of teacher-training students (3.856) was greater than law students (2.795) in this area. It may be stated that the teacher-training students have more adjustment problems than the law students. The *t*-value (1.966) in emotional area was found significant at .05 level of significance. The mean value of teacher-training students was obtained (12.448) which was greater than the mean value of law students (11.225). It seems from these results that the teacher-training students have more adjustment problems in emotional area than the law students. The table also reveals that the *t*-values for home,

social and educational areas were not found significant even at .05 level of significance. It may be stated that teacher-training and law students have no significant difference in the adjustment in these areas. Hence the sixth hypothesis is partly accepted in respect of health and emotional areas.

Conclusions

In view of the foregoing discussion and results the following conclusions may appear tenable :

1. Engineering and medical students have no significant difference in adjustment problems in home, health, social, emotional and educational areas.
2. Teacher-training students have greater adjustment problems than engineering students in home and health areas while engineering students have greater adjustment problems than teacher-training students in educational area. No significant difference exists in adjustment problems in both groups in social and emotional areas.
3. Law students have lesser adjustment problems than engineering students in social and educational areas while law students have poor adjustment in home area than engineering students. Both these groups have no significant difference in their adjustment problems in health and emotional areas.
4. Medical students have more adjustment problems than teacher-training students in educational area while teacher-training students have more adjustment problems in home area than medical students. Both these groups have no significant difference in their adjustment problems in health, social and emotional areas.
5. Medical students have more adjustment problems in social and educational areas than law students. On the other hand law students have more problems in home area than medical students. No significant difference exists in adjustment problems in health and emotional areas.

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6. The teacher-training students have greater adjustment problems in health and emotional areas than law students. No significant difference exists in adjustment problems in home, social and educational areas in both these groups.

Implications

It is hoped that the present study will throw light on the adjustment problems in different areas faced by the professional (law, teacher-training (B.Ed), medical and engineering) students. It will emphasize the need and importance of the extensive study in this area. The findings of the study will help educationists, psychologists, social workers, parents and other community members to understand the problems and needs of the professional students. The study may also be of great importance to teachers who will know the problems of these students and will try for the good adjustment, greater achievement and professional uplift. They will also change or modify their dealing with the students either in classroom or outside. The study will also suggest suitable remedies and assess the effectiveness of various plans executed in reduction of problems of professional college students.

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Ph. D. Theses Abstracts

A Critical Appraisal of Some Innovations for the Improvement of Examinations

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THE major objectives of the study were : (i) to compare the inter-examiner reliability in the evaluation of examination paper on five- and seven-point letter grades and numerical scale, (ii) to compare the inter-examiner reliability in question-wise and script-wise letter grade assessment, (iii) to find out the coefficient of correlation between internal assessment based on different sets of criteria and external examination, (iv) to improve the question of an essay-type test and investigate its effect on inter-examiner reliability, (v) to find out and compare the coefficient and correlation of open-book type and traditional type question paper with a valid criterion, (vi) to compare the correlations and mean differences in the scores on the two halves of internal and external choice, (vii) to assess the attitude of examiners of arts and science subjects at under-graduate and postgraduate levels in universities, (viii) to estimate the percentages of the examiners holding particular views on different aspects of spot evaluation, and (ix) to collect facts and figures of the re-evaluation cases at the postgraduate level from a sample of universities in Northern India.

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The study was conducted separately for each type of objectives. Different designs were prepared for different objectives. Answer scripts were graded by the university approved teachers on five-point and seven-point numerical scales, questionwise and scriptwise. Scores of internal and external assessment were collected from different universities. Essay type question papers were improved to bring objectivity in them. Original and improved question papers were evaluated by teachers and inter-examiner reliability was found out.

Question papers were prepared for open-book examinations and an objective test was also prepared as a criterion test. Attitude towards spot evaluation on each item and total scores was seen. The internal and external choices in essay examinations were compared and the fall in scores and differences were recorded. The facts and figures about re-evaluation cases in different universities were calculated. The findings of the study revealed that :

1. There was no significant difference between average assessment on five- and seven-point letter grade scale.
2. There was no difference between scriptwise and questionwise assessment.
3. Internal assessment scores were highly correlated with external assessment of two of the universities where number of students was small, in spite of the fact that internal assessment besides scholastic achievement measure few other dimensions also.
4. The correlation between the marks of different examiners for the improved paper was higher than the original one. Two r 's differed significantly.
5. There was no significant difference between open and closed book examinations.
6. The correlation for internal choice was higher than the external choice. The difference was significant between types of choices. The fall of scores in two types was also significant.
7. The university teachers were favourable towards spot evaluation. There was no significant difference in the views of different categories of teachers from different levels of educational institutions. The reliability of attitude scale was satisfactory.
8. The analysis on revaluation shows that there is no uniformity in the rules and regulations, and different rules may affect the same case differently.

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A Study of Certain Personal and Social Determinants of Sociometric Clique Formation among Adolescent Boys

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THE investigation aimed at verifying the working of similarity theory (Newcomb 1961) and of complementarity theory (Winch 1958) as the bases of clique formation among adolescent boys. The main objectives of the study were :

1. To identify psychological as well as social factors that facilitated the development of mutual attraction among adolescents to form cliques.
2. To study relationship between self-perception and reciprocal perception in clique formation.
3. To study leadership pattern in clique structures.

Method

Sample : One hundred and eighty undergraduate males of University College, Kurukshetra, were studied in 60 cliques, each a tightly knit group of three adolescents all of whom chose each other mutually on a sociometric general criterion of 'to sit with' in the class. Their mean age was 18 years.

Factors studied : Some personal factors such as academic achievement, values, interests, needs and personality traits as given by 16 PF, and social factors like social status, locality, size of family, proximity, language and factors related to studies such as subjects of choice, leisure time activities and leadership pattern in cliques were studied.

Tools : (i) Sociometric questionnaire—Moreno's method, (ii) Allport-Vernon test of values by R.K. Ojha, (iii) Interest record By R.P.

*Thesis submitted to Kurukshetra University (1981)

Singh, (iv) Tripathi personal preference schedule by R.R. Tripathi, (v) Cattell's 16 PF questionnaire, and (vi) Non-directive interview schedule (self-constructed). These consisted of 36 items relating to social status, language, proximity, locality, size of family, perception of self and perceived characteristics of physical, intellectual, behavioural and social qualities of clique members and leadership pattern.

Procedure : The sociometric questionnaire was administered to 496 undergraduate male students. They were instructed to give three choices in order of preference of the students present in the class with whom they would like to sit in the class. Festinger's (1966) matrix multiplication technique was used to identify the cliques. Thus 60 independent tightly knit cliques, each comprising of three members were selected for further investigation. The overlapped and/or cliques with less degree of cliquishness were left out. The value test, interest record, TPRS and 16 PF questionnaires were filled by the subjects in quite small groups. Non-directive interview schedule, however, was administered individually. The coefficients of split-half reliability (with Spearman-Brown formula) of the tests (taking scores of 20 randomly selected cliques) revealed the following ranges :

Value test : .77 to .94 in all the six values.

Interest record : .68 to .91 in all the seven interest factors.

16 PF questionnaires : .65 to .91 in all the 16 factors.

Consistency index of TPRS (all the subjects) was 10.55.

The data analysis : The criteria of similarity and of complementarity were set up as under :

1. *Similarity principle :* (a) Sociodemographic factors : all or none principle; chi-square test of equality with or without Yate's correction significant at .05 level. (b) Values, interests, needs (TPRS) and 16 PF : Significant positive partial correlations between the members of all the pairs in the cliques.
2. *Complementarity principle :* Needs (TPRS) and 16 PF : Significant negative partial correlations between the members of all the possible pairs in the cliques. Since interests and values are not bipolar, this hypothesis could not be tested in their cases.

Results

Locality (in terms of rural and urban) and proximity in terms of seat in the classroom were found to be significant factors in clique formation. Residential proximity, family relations and kinship-relationships played a negligible role. Cliques got formed irrespective of the similarity in social status and academic achievement in previous annual examinations. Clique members were not found to be similar in their liking and/or dislike for subject/s of studies. However, similar choice of courses of study and leisure time activities were found to be significant factors in clique-formation. The role of mother tongue and that of Hindi as a language of communication came out to be a conspicuously significant factor. Clique members perceived their home environment as healthy and favourable. They reported affectionate and favourable relationships with their parents and siblings. A significant similarity was found in their positive self-perception and reciprocal positive perception of one another regarding physical, intellectual, behavioural and social qualities. Every clique had a leader—the most liked, popular and unanimously selected group member.

Similarity of values came out to be one of the potent factors in clique formation. Clique members were also found to be similar on interest factors like business and social. Similarity in needs, i.e. n-change, n-exhibition, n-achievement, n-affiliation, and n-heterosexuality also emerged as significant related to clique formation. However, personality traits (as assessed by 16 PF questionnaire) remained unrelated to clique formation in this study. No support to complementarity principle was found in any of the factors under investigation.

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A Sociological Study of Educational Development of Graduate Students of Kumaun University with Special Reference to Caste

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PRIOR to the establishment of Kumaun University (November 1973), there were very few avenues of higher education in Kumaun hills. But as soon as the university was established, the opportunity of availing higher education became more easier for every one. The campus of higher education in Kumaun is facing many problems—cultural vacuum, ambitious expectancy-matrix, hostility and bitterness amongst the caste groups, disregard and defiance of established statutory provisions, poor job-market and bleak future prospects. Structurally the university is still in making. But this condition, if allowed to continue longer, may generate adverse effect upon the academic life of this area. So the investigator had located the central point which in turn affects the environmental setting of the campus—the student community. These students belong to heterogeneous groups, due to variance in social surroundings, social status, social awareness, economic condition and various other allied factors.

It is a common presumption that education is rationally effective in equalization of a social system (Sharpe 1973). It is further presumed that with the expansion of educational facilities among the masses, the traditional stereotypes related to different differentiating indicators of a social system tend to merge losing their differentiating sharpness

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(Rokeal 1975). Now the university has completed almost eight years of its functioning. Its mere presence must have affected some change in social perceptions, as social scientists believe. the mere awareness of institution generates a stable change in social habits, customs, and perceptions (Zelinszic 1969, Lawton 1969 and Boudieu *et al.* 1965). The theme of this study was to analyse this phenomenon.

The Present Study

In order to understand the nature and direction of change that is supposed to be taking place due to this innovation in this region, the first ingredient that is going to be studied is constituted of the sociological study of the students. Secondly, within the institutional framework a student tries to identify with the objectives of that institution. Some of them have shown consistently higher achievement but others have just maintained what they have achieved earlier—throughout their stay in the institutions. There are still others that reveal a very irregular trend—sometimes much above the normal but sometimes much below it. If a student community belongs to the same social milieu, then what social characteristics these variations in achievement can be ascribed to. Hence, it is a sociological study of educational development of graduate students. But to concretize the problem, another dimension which has usually escaped the attention of sociologists and social scientists—the caste—is also incorporated with it to know that how far it is relevant and useful to impart almost identical education to basically different and non-identical social groups, having long and strong socio-culturally and religio-economically differing traditions behind them. So in this study special emphasis has been given to caste—as ascriptive category. Thus it is a sociological study attempting to understand and analyse the socio-economic and cultural set-up of the Kumauni society consisting of 15 basic social characteristics of the subjects. It is a study of educational development of graduate students of Kumaun University. For this, the analytical categories (upward mobile graduates—UMG, irregular graduates—IG and stagnate graduates—SG) given by Puline (1969) were adopted. In this study the achievement profiles of different examinations (e.g. high school, intermediate and B.A. I/B.Sc. I/B.Com. I) of the students were analysed and thus they were assigned to different categories (UMG, IG and SG).

Objectives

1. To find out the relationship between various sociological characteristics of the graduates of Kumaun University to different castes to which they belong.
2. To know whether differences in the sociological characteristics of the graduates of different castes account for any significant difference in their educational development.
3. To identify the sociological characteristics that turn out to be common and significant predictors of the educational development of the graduates.
4. To assess the effect of caste belongingness and educational development of the students on their level of social adjustment, perceptions toward caste prejudices and social distance.

Obviously based on the objectives stated above, appropriate null-hypotheses were formulated for empirical validation.

Hypotheses

1. There is statistically no significant difference amongst the graduates of different groups of educational development belonging to the same faculty and same caste on various measures of sociological characteristics.
2. There is statistically no significant differences amongst the graduates of different castes belonging to the same faculty and same group of educational development on various measures of sociological characteristics
3. Such differences are not significant statistically, when analysis of the various measures of sociological characteristics is attempted in relation to caste groups and groups of educational development of the same faculty, simultaneously.
4. Again, there is statistically no significant difference when analysis of the measure of social adjustment, caste prejudices and social distance is attempted in the light of caste groups and groups of educational development of the same faculty, simultaneously.

Design of the Study

From the selected sample, initially with the help of students' academic achievement profiles, three groups of educational developments

(UMG, IG and SG) were formed from the selected sample. Then the graduates of these three groups were assigned to caste groups they belonged (Brahmin, Kshatriya, Vaishya and Other castes*) for different faculties (arts, science and commerce) separately. In a way, the design of the study was turned out to be $4 \times 3 \times 3$ factorial design with unequal cases in each cell. It was adopted with a view to understand the influence of factors like caste, developmental stage and curricular offerings, upon the graduates of Kumaun University.

The sample of 1,050 graduate students was drawn randomly from the students' population of graduate classes (B.A. II, B.Sc II and B.Com. II) of the session 1979-80 from seven institutions of Kumaun University located at Almora, Berinag, Haldwani, Kashipur, Naini Tal and Pithoragarh. The investigator had chosen the proportions of different caste groups in the sample on the basis of their caste percentages in the population of different faculties of Kumaun University in the years 1976-77 and 1977-78.

The following tools were used to measure the variables contained in the tools :

1. Social Characteristic Description (SCD) by Uniyal and Shah
2. Social Distance Scale (SDS) by Uniyal and Shah
3. Social Adjustment Inventory (SAI) by Deva
4. Indian Caste Prejudice Scale (ICPS) by Singh and Prasad.

Major Findings and Conclusions

I. When the graduates of different castes of Kumaun University were studied on various sociological measures of SCD, the following results were obtained :

1. Graduates of all castes (B, K, V, and O) were almost similar on the variables of curricular preferences : vocational aspiration, vocational mobility, determinants of courses of studies, motivation for graduation and position among siblings.
2. On the variables of family-educational background, father's vocational status and family reinforcement, the graduates of Brahmin and Vaishya castes were significantly higher than the

*Other caste group comprises the students of scheduled castes, scheduled tribes and backward castes.

- graduates of Kshatriya and other castes. On these variables Kshatriyas were found to have significantly higher mean scores than others (SC, ST and BC).
3. In respect of economic condition, Vaishyas were found at the top, Brahmins and Kshatriyas had also reported themselves in more satisfactory position than the graduates of other castes.
 4. Vaishyas had experienced very small number of hurdles in their academic life and in majority they also belonged to urban centres than their other counterparts of Brahmin, Kshatriya and other castes group.
 5. Academic reinforcement variable was more prominent among the graduates of other castes and they were also at an advanced age and significantly older than the graduates of other castes group (B, K, and V).
 6. Kshatriyas were remarkably high on the variables of co-curricular preferences than the Brahmins and other castes but were similar to Vaishyas. While on this dimension the graduates of other castes were found nearer to Brahmins as well as Vaishyas.
 7. On controlling the groups of educational development (UMG, IG, SG), the sharpness of the variations between caste groups on these variables was remarkably minimized.

In brief it can be said that one's educational development was affected more by different sociological variables than by his caste belongingness. The intensity of these sociological measures varies from caste to caste and so it has affected their different groups of educational development.

II. When different groups of educational development were compared on these sociological measures, some very fruitful results were obtained :

1. The upward mobile graduates were significantly higher on the variables—economic condition, family educational background, father's vocational status, curricular preferences, family reinforcement, academic reinforcement, vocational mobility (in view of traditional occupation) but they had small number of hurdles, low participation in co-curricular activities and belonged to a comparatively younger age-group than the irregulars and stagnates.

2. The irregulars were significantly higher than their stagnate counterparts on the variables of economic condition as well as co-curricular preferences but they were identified to be almost similar on other aforesaid variables.
3. On the variable of position among siblings, a higher proportion of upward mobile graduates reported them either elder or younger (means first born or last born) among their siblings while irregulars and stagnates were somewhere in the middle among their siblings.
4. In respect to social belongingness, the majority of the upward mobiles was found in urban areas while that of irregulars and stagnates belonged to rural centres,
5. On vocational aspiration, vocational mobility (in view of father's occupation), determinants of courses of studies and motivation for graduation, no variation was found among the different groups of educational development
6. Again when these groups of educational development were compared on these variables for different castes (B, K, V and O) separately, no variations from the above-discussed results were identified on the variables—economic condition, family educational background, co-curricular preferences, family reinforcement, hurdles, vocational aspiration, vocational mobility (in view of father's occupation) and determinants of courses of studies.
7. On the variables—father's vocational status and social belongingness—the results were deviated only for Vaishya graduates. In this case Vaishyas of all the categories of educational development were found almost similar on these variables, which is natural.
8. In the remaining variables (e.g. curricular preferences, age, vocational mobility 'in view of traditional occupation' and position among siblings) very small deviations from the above-discussed findings were identified.

Thus, caste has not affected the educational development of the Kumauni students. The variables, e.g. vocational aspiration, determinants of courses of studies and vocational mobility (in view of father's occupation) had not played any significant role in the area of educational development. Curricular preferences, age, vocational mobility (in view of traditional occupation), motivation for graduation and position

among siblings were weak predictors while economic condition, family educational background, father's vocational status, family reinforcement, academic reinforcement, co-curricular preferences, hurdles and social belongingness were highly effective measures of educational development.

III. On the other sociological measures, e.g. SAI, ICPS and SDS, the following results were identified :

1. In the realm of social adjustment, caste differences were not identified but a positive relationship between social adjustment and achievement in upward direction was noted.
2. On the dimension of political, social and economic gain (PSEG) of ICPS, all the caste groups as well as groups of educational development were almost identical but on the remaining dimensions, e.g. marriage and interpersonal relationship (MIR), education, employment and inhabitation (EEI) and personal qualities (PQ), the graduates of higher castes were more prejudiced than their low-caste counterparts (SC, ST and BC).
3. In the realm of social distance the graduates of other caste groups appeared more willingly to keep their intimate relations as well as friendly cooperation with people of higher castes while the converse was not accepted so frequently. The Vaishyas had shown more generous attitude towards friendly cooperation while the same group had shown strong caste affiliations in respect of intimate relations than Brahmins and Kshatriyas. Whereas Brahmins had more modernized outlooks than Kshatriyas regarding the intimate relations as well as friendly cooperation.
4. Among the different groups of educational development, the irregulars and stagnates had strong caste prejudices on MIR, EEI and PQ dimensions of ICPS as compared to their upward mobile counterparts. This repeated through the measures of SDS as irregulars and stagnates had strong caste affiliations than upward mobiles on the variables of intimate relations and friendly cooperation both.

In Kumaun, higher education has not resulted in changing and fostering the attitudes of students towards different castes. But the degree of educational development has affected their caste perceptions. It is somewhat surprising that despite the presence of caste prejudices

and caste distances amongst the various caste groups, the social adjustment was found to be satisfactory. This is perhaps because of a very long conditioning of society in adjusting in contradictions. Social psychologists can very well examine to this phenomenon and they can reveal the psychological factors behind such strange adjustment mechanism.



A Study of the Educational Ideas of Rabindranath Tagore and Their Relevance to Contemporary Thoughts and Practices in Education

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THE objective of the study is to identify the exact educational ideas which Rabindranath Tagore accepted and developed and tried to implement into practice, assess how far these ideas are relevant to contemporary thoughts and practices in education and examine which of these educational ideas are still consistent with and applicable to the present socio-economic situation of our country.

Samples, Tools and Methodology

In this study an attempt was made to survey the educational ideas, activities and processes adopted by Rabindranath Tagore, identify the contemporary thoughts in education and find out whether or not the educational theories and practices of Tagore were in agreement with contemporary thoughts on educational theory and practice for solving the socio-economic and cultural problems of a developing as well as the

*Thesis submitted to Visva-Bharati University (1979)

world society. In this study Tagore's educational ideas were collected and classified into philosophical, psychological and socio-economic dimensions. Efforts were also made to analyse Tagore's ideas in each dimension and estimate how far these ideas synchronize with those of contemporary educational thinkers. In this analytic study there was little scope for use of sampling technique and common tools of social research. Content analysis was used here both as a tool and technique to analyse the educational ideas and activities of Rabindranath Tagore and other global educational thinkers of this age. The data obtained here were the philosophical, psychological, sociological and pedagogical ideas of Tagore on one hand and those of the other great contemporary educational thinkers, on the other. The method adopted was a critical comparison between the two sets of data to justify the consistency and relevance of the first set in the context of the second.

Summary of Findings

1. Tagore's idea of education for ultimate human unity through communion with Nature mingled with freedom and joy and cultural collaboration with other people synchronized with the views of Froebel.

2. Tagore's concept of education as an instrument of development of mutual cooperation and sympathy, as well as prevention of alienation and segregation was in conformity with the ideas of Martin Buber and Gunnar Myrdal.

3. Rabindranath regarded education as a tool of developing national integration and international understanding which is quite consistent with modern thoughts on education.

4. Tagore's concept of teacher as a 'Guru' was very close to the ideas of Martin Buber, to whom the teacher is the initiator and maintainer of 'I—Thou' relationship for development and emancipation of pupils. But such teachers are rarely available in the present educational set-up of the world as teaching has been accepted as a profession and not as a mission by an absolute majority of the teachers.

5. Tagore's idea of religion and religious education was relevant to the objective of building a classless true democratic society and was similar to the ideas of A.N. Whitehead and R.S. Peters.

6. Rabindranath's idea of education for socialization of children was in conformity with the views of social psychologists like Edward G. Oslen and S. Winfred. His efforts to inculcate through education a feel-

ing of freedom and belongingness to the institution through cordial teacher-pupil relationship was consistent with the experimental findings of psychologist J.E. Brewer and K. Lovell.

7. Tagore's views of education in close coordination of the community for distribution of the richness of the heritage and inculcation of the values of the society were similar to the ideas of John Dewey.

8. Tagore's introduction of the creative, playful and productive activities in education for conditioning and channelization of emotions, prevention of emotional deprivation and maintaining emotional stability of the adolescent pupils was in conformity with the views of developmental psychologists like Elizabeth Hurlock.

9. Tagore's view that 'reward and punishment do not provide any achievement motivation and except teachers' initiation, inspiration and encouragement, no material reward is needed to motivate the students and punishment only deteriorates motivation' was very close to the psychological findings of H.P. Mussen and R.S. Peters.

10. Rabindranath's idea about the role of institutional environment towards cognitive development of the pupils bore some partial resemblance with the findings of Piaget.

11. Tagore's emphasis on development of social awareness, skillfulness, productive ability and social usefulness through education was relevant to the idea of A.N. Whitehead and Mahatma Gandhi and the recommendations of Mudaliar and Kothari Commissions.

12. Tagore's idea of discipline through autonomy of the students and through their cooperation and active participation is consistent with the recommendations of Education Commission, 1966 and Gajendragadkar Committee on University Governance, 1976.

13. The relevance of Rabindranath's emphasis on the mother tongue both as the medium of instruction and education for proper apprehension and understanding of the ideas received and the expressions of the same was beyond all questions.

14. Finally, Tagore's introduction of functions and festivals in his educational institutions and his efforts to turn them as cementing forces to bring the institutions close to the community, to break the isolation between the elite and the folk, to release the creative powers of the students and the teachers, to help social cohesion and cultural reorientation and synthesis and to pave the path of social and national integration is still relevant in the present Indian as well as world situation.



A Study of Factors Associated with Teachers' Predisposition to Adopt Educational Innovations

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ONE of the major challenges to education today is the rapidity with which the schools must adopt to changing social conditions. Though education lags behind, nevertheless, there is a heightened concern for educational change.

The post independence era of Indian education has witnessed a number of efforts to bring about changes in all aspects of education. As a result, many innovations have appeared on the educational scene. Some have survived and have made valuable contributions. Many have been modified beyond recognition, others have failed instantly. Most current efforts to change in India are only mildly successful. While there are many reasons of unsuccessful innovation, one cause is the reluctance of the teachers to accept change. Obviously, some factors are involved that influence the teachers' tendency to accept innovations. Knowledge of these factors is deemed essential because of the emphasis placed on change in the world today. If the success of innovations does depend on these factors, those administrators bearing responsibilities in the instructional programme should be aware of them and look for them when recruiting new teachers and when choosing teachers to work with an innovative programme.

Objectives

The following were the specific objectives of the study :

1. To find out how the different sub-groups of teachers, classified

*Thesis submitted to M.S. University of Baroda (1980)

- according to certain personal characteristics, differ in their predisposition to adopt innovations.
2. To empirically establish the relationship between predisposition to adopt innovations and the following perceived characteristics of the school : (i) principal's support of the innovations, (ii) colleagues' support of the innovations, and (iii) students' support of the innovations.
 3. To empirically establish the relationship between predisposition to adopt innovations and the following perceived characteristics of the innovations : (i) communicability, (ii) divisibility, (iii) complexity, (iv) relative advantage, and (v) compatibility.
 4. To empirically establish the relationship between predisposition to adopt innovations and the following personality characteristics : (i) traditionalism, (ii) change-proneness, (iii) progressivism, (iv) conservatism, (v) venturesomeness, and (vi) dogmatism.
 5. To determine the relative and joint contributions of the variables associated with the perceived characteristics of the school, the perceived characteristics of the innovations and the personality characteristics towards the prediction of the predisposition of the teachers to adopt educational innovations.

Hypotheses

The following null-hypotheses were formulated for the present investigation.

1. There is no significant difference between the mean predisposition scores of : (i) male and female teachers, (ii) younger (below 35 years of age) and older (35 or over 35 years of age) teachers, (iii) teachers with less than five years of teaching experience and those with five or more years of teaching experience, (iv) teachers with a master's degree and those with a bachelor's degree, (v) teachers with professional experience outside their current school system and those without such experience, (vi) teachers who have received some in-service education during the preceding three years and those who have received none during the same period, (vii) teachers who have read some research studies in education during the preceding three years and those who have read none during the same period, (viii) teachers who are professionally satisfied and who are not.

- 2 There is no significant relationship between the predisposition to adopt innovations and the following perceived characteristics of the school : (i) principal's support of the innovations, (ii) colleagues' support of the innovations, (iii) students' support of the innovations.
- 3 There is no significant relationship between the predisposition to adopt innovations and the following perceived characteristics of the innovations : (i) communicability, (ii) divisibility, (iii) complexity, (iv) relative advantage, (v) compatibility.
4. There is no significant relationship between the predisposition to adopt innovations and the following personality characteristics : (i) traditionalism, (ii) change-proneness, (iii) progressivism, (iv) conservatism, (v) venturesomeness, (vi) dogmatism

Variables

Three sets of independent variables were identified for use in the present study. One set included the following three variables associated with the perceived characteristics of the school : (i) principal's support of the innovations, (ii) colleagues' support of the innovations, and (iii) students' support of the innovations. The second set consisted of the following five variables associated with the perceived characteristics of the innovations : (i) communicability, (ii) divisibility, (iii) complexity, (iv) relative advantage, and (v) compatibility. The third set included six variables associated with the personality characteristics of the respondents and eight variables associated with their biographical characteristics. The personality variables utilized were : (i) traditionalism, (ii) change-proneness, (iii) progressivism, (iv) conservatism, (v) venturesomeness, and (vi) dogmatism. The biographical variables used were : (i) sex, (ii) age, (iii) teaching experience, (iv) academic qualifications, (v) professional experience outside the current school system, (vi) in-service education, (vii) professional reading, and (viii) professional satisfaction.

'Predisposition to adopt innovations' is the dependent variable. Thus, in all 23 variables, one dependent and 22 independent, were involved in the present study.

Sample

The sample of the study consisted of 372 teachers, 203 male and 169 female, drawn from 38 higher secondary schools spread all over the Union Territory of Delhi.

Data-gathering Instruments

The data in this study came through the following five instruments :

1. The educational innovation attitude scale developed by the investigator, is a closed-form, Likert-type, summated rating scale, designed to measure teachers' predisposition to adopt educational innovations.
2. The form for the indication of perceived values of the characteristics of the school was used to obtain data for the three variables associated with the perceived characteristics of the school.
3. The form for the indication of perceived values of the characteristics of the innovations was used to obtain data for the five variables associated with the perceived characteristics of the innovations.
4. The combined six-scale questionnaire as developed by McGeown (1973) was used to acquire data for the six variables associated with the personality characteristics of the respondents.
5. The biographical data form was designed to acquire the biographical data of the respondents.

Statistical Techniques

The study involved the use of the following statistical techniques: the 't' test, Person product-moment correlation and the step-wise regression analysis.

Results

The results of the data analysis revealed the following findings for each hypothesis :

1. Hypothesis 1(i) which proposed that there is no significant difference between the mean predisposition scores of male and female teachers, was accepted.

2. Hypothesis 1(ii) which stated that there is no significant difference between the mean predisposition scores of younger (below 35 years of age) and older (35 or over 35 years of age) teachers, was also accepted.

3. Hypothesis 1(*iii*) which proposed that there is no significant difference between the mean predisposition scores of teachers with less than five years of teaching experience and those with five or more years of teaching experience, was confirmed.

4. Hypothesis 1(*iv*) which proposed that there is no significant difference between the mean predisposition scores of teachers with a master's degree and those with a bachelor's degree, was also confirmed.

5. Hypothesis 1(*v*), which proposed that there is no significant difference between the mean predisposition scores of teachers with professional experience outside their current school system and those without such experience, was supported.

6. Hypothesis 1(*vi*), which proposed that there is no significant difference between the mean predisposition scores of teachers who have received some in-service education during the preceding three years and those who have received none, was also supported.

7. Hypothesis 1(*vii*), which proposed that there is no significant difference between the mean predisposition scores of teachers who have read some research studies in education during the preceding three years and those who have read none during the same period, was accepted.

8. Hypothesis 1(*viii*), which proposed that there is no significant difference between the mean predisposition scores of teachers who are professionally satisfied and those who are not, was rejected. Professionally satisfied teachers were found to be significantly more predisposed to adopt innovations than those who were professionally not satisfied.

9. Hypothesis 2(*i*), which stated that there is no significant relationship between the predisposition to adopt innovations and the perceived principal's support of the innovations, was rejected. A significant positive relationship was found between these two variables.

10. Hypothesis 2(*ii*), which proposed that there is no significant relationship between the predisposition to adopt innovations and the perceived colleagues' support of the innovations, was also rejected. A significant positive relationship was found between these two variables.

11. Hypothesis 2(*iii*), which stated that there is no significant relationship between the predisposition to adopt innovations and the perceived student's support of the innovations, was supported.

12. Hypothesis 3(*i*), which proposed that there is no significant relationship between the predisposition to adopt innovations and the perceived communicability of the innovations, was rejected. A significant positive relationship existed between these two variables.

13. Hypothesis 3(*ii*), which stated that there is no significant rela-

tionship between the predisposition to adopt innovations and the perceived divisibility of the innovations, was accepted

14. Hypothesis 3(*iii*), which stipulated that there is no significant relationship between the predisposition to adopt innovations and the perceived complexity of the innovationism was not supported. A significant negative relationship was found between these two variables.

15. Hypothesis 3(*iv*), which proposed that there is no significant relationship between the predisposition to adopt innovations and the perceived relative advantage of the innovations, was partially supported. A significant positive relationship was found between the two variables for the male teachers. No significant relationship between these two variables for the male teachers was found in case of female teachers.

16. Hypothesis 3(*v*), which stated that there is no significant relationship between the predisposition to adopt innovations and the perceived compatibility of the innovations, was accepted.

17. Hypothesis 4(*i*), which stated that there is no significant relationship between the predisposition to adopt innovations and traditionalism, was confirmed

18. Hypothesis 4(*ii*), which proposed that there is no significant relationship between the predisposition to adopt innovations and change-proneness, was rejected. A significant positive relationship was found between the two variables. This finding shows that teachers with an orientation towards change-proneness tend to be more predisposed to adopt innovations,

19. Hypothesis 4(*iii*), which proposed that there is no significant relationship between the predisposition to adopt innovations and progressivism, was also rejected. A significant positive relationship was found between the two variables. This shows that teachers with a progressive orientation tend to be more predisposed to adopt innovations.

20. Hypothesis 4(*iv*), which proposed that there is no significant relationship between the predisposition to adopt innovations and conservatism, was not accepted. There was a significant negative relationship between the two variables. This finding indicates that the more conservative teachers are less likely to be predisposed to adopt innovations.

21. Hypothesis 4(*v*), which proposed that there is no significant relationship between the predisposition to adopt innovations and venturesomeness, was also not accepted. A significant positive relationship existed between these two variables. This shows that teachers with an

orientation towards venturesomeness tend to be more predisposed to adopt innovations

22. Hypothesis (v) , which proposed that there is no significant relationship between the predisposition to adopt innovations and dogmatism, was rejected. A significant negative relationship was found between the two variables. This shows that the more dogmatic teachers are less likely to be predisposed to adopt innovations.

23. The step-wise multiple regression analysis (carried out for the total sample as also for males and females separately) revealed the following variables (in order of importance) that predict the predisposition of the teachers to adopt innovations :

Total sample : Change-proneness, complexity, progressivism, dogmatism and venturesomeness

These five independent variables jointly accounted for 46.76 per cent ($R=.6838$, $R^2=.4676$) of the criterion variance. The amount of variation in the dependent variable explained by each of these variables was : change-proneness, 31.45 per cent, complexity, 6.56 per cent, progressivism, 4.08 per cent, dogmatism, 3.30 per cent, and venturesomeness, 1.37 per cent.

Males : Progressivism, complexity, dogmatism, and venturesomeness

These four independent variables together accounted for 44.72 per cent ($R=.6687$, $R^2=.4472$) of the variance in the criterion variable. The amount of the variance explained by each of these variables was : progressivism, 27.86 per cent, complexity, 11.67 per cent, dogmatism, 3.83 per cent and venturesomeness, 1.86 per cent.

Females : Change-proneness, venturesomeness, complexity, dogmatism, and communicability

53.38 per cent ($R=.7306$, $R^2=.5338$) of the variance in the criterion variable was explained by the combined effect of these five independent variables. The amount of variance explained by each of these five variables was : change-proneness, 42.08 per cent, venturesomeness, 4.06 per cent, complexity, 3.24 per cent, dogmatism, 2.00 per cent, and communicability, 1.97 per cent. □

Research Notes

Attainments of Student-Teachers in Educational Theory : A Factorial View

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THE teachers' training programme has been criticized by the Education Commission. It says that the existing programmes of teacher education are largely traditional, rigid and divorced from the realities of schools. The Commission further emphasizes that it is not sufficiently realized that courses for professional subjects contain a great deal of matter which is either out of date or has little relevance to a teacher's work in the school. Such dead matter should be eliminated and replaced by what is directly related to the personal and professional needs of student-teachers. J.P. Naik emphasized that research is needed to evaluate the training programmes that we carry out at present and to ascertain their effectiveness. There is a feeling among teacher-educators that theory courses do not seem to have in them enough of matter that may be said to be correlated with proper attitude towards pupils. The present study was undertaken to see how far the factual knowledge acquired in the various subject areas of the theory courses are related with the attitude towards pupils.

Sample

A sample of 500 student-teachers was taken from all the training colleges of Haryana. The sampling was of stratified cluster type.

Objectives

1. To study the relationship between the different theory papers of the theory course and the attitude of the pupil-teachers towards pupils.
2. To construct objective type achievement tests in different theory papers of the B.Ed. course.

Tools

(a) The objective type achievement tests were constructed to assess the attainment of the student-teachers after proper pre-try-out, try-out and item analysis. The main features of papers are shown in Table 1.

TABLE 1

<i>S.No.</i>	<i>Paper</i>	<i>Type of Items</i>	<i>No. of Items</i>	<i>Time in minutes</i>	<i>Reliability coefficient (split-half)</i>	<i>Validity</i>
1.	Principles of education	Matching and multiple-choice types	42	32	.94	Content validity
2.	Techniques of education	All multiple-choice types	34	25	.86	—do—
3.	Educational psychology	—do—	58	41	.95	—do—
4.	Modern Indian education and its problems	—do—	46	35	.88	—do—
5	School organization	Matching and multiple-choice types	40	28	.95	—do—

(b) Minnesota teacher attitude inventory (MTAI) was used to measure attitude as a teacher.

Statistical Treatment of Data

For setting up a correlation matrix, product moment correlations were computed between scores of different achievement tests and MTAI scores.

TABLE 2
CORRELATION MATRIX

<i>Papers</i>			<i>I_a</i>	<i>I_b</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>M</i>
Paper	Ia	: Principles of education	—	.36	.51	.39	.32	.11
Paper	Ib	: Techniques of education	.36	—	.44	.32	.76	.20
Paper	II	: Educational psychology	.51	.44	—	.83	.65	.32
Paper	III	: Modern Indian education and its problems	.39	.32	.83	—	.44	.14
Paper	IV	: School organization	.32	.76	.65	.44	—	.07
M		: Minnesota teacher attitude inventory	.11	.20	.32	.14	.07	—

Factor Analysis

Centroid method was followed for factor analysis.

Oblique Rotation

The extended vectors method of Thurstone was followed for oblique rotation.

Correlations between the Oblique Factors

The correlations between the primary factors were computed from the matrix of intercorrelations of the reference axes, according to the procedure laid down by Comrey.

Results and Conclusions

For interpretation of statistical results and drawing conclusions, the rotated oblique factor matrix with unextended vectors and the matrix of correlations between oblique factors are given in Tables 3 and 4.

TABLE 3
 ROTATED OBLIQUE FACTOR MATRIX WITH FOLLOWED
 UNEXTENDED VECTORS

<i>Papers</i>		<i>A</i>	<i>B</i>	<i>C</i>
Paper	Ia	.0014	.2479	.3871
Paper	Ib	<i>.1979</i>	<i>.8145</i>	.0059
Paper	II	.3987	.0985	.7882
Paper	III	.1601	.0034	.7578
Paper	IV	.0944	<i>.6142</i>	<i>.2683</i>
MTAI		<i>.4362</i>	.0028	.0250

Note: Loading of the value of .1979, i.e. very nearly .2 or more have been italicized.

TABLE 4
 THE MATRIX OF CORRELATIONS BETWEEN OBLIQUE FACTORS

	<i>A1</i>	<i>B1</i>	<i>C1</i>
A ₁	1.0000	.1935	.1625
B ₁	.1935	1.0000	.3043
C ₁	.1625	.3043	1.0000

Factorial Structure

The picture after the factor analysis and oblique rotation of the axes reaches to an approximately 'simple structure' is there in Table 3 and correlations between the oblique factors is given in Table 4. It will be noted that Table 3 does broadly meet the criteria of simple structure, if we remember that small loadings may be taken as vanishing loadings. The investigator decided to base his inferences only on factor loadings of the value of .20 or more. On the basis of this criterion three different syndromes are apparent and they are tied together by three different factors.

Syndrome I (together by factor A)

Paper I Techniques of education, with factor loading .1979

Paper II Educational psychology, with factor loading .3987

(MTAI) Minnesota teacher attitude inventory, with factor loading .4362.

Syndrome 2 (tied together by Factor B)

Paper Ia Principles of education, with factor loading .2479
 Paper Ib Techniques of education, with factor loading .8145
 Paper IV School organization, with factor loading .6142

Syndrome 3 (tied together by Factor C)

Paper Ia with factor loading .3871
 Paper II with factor loading .7882
 Paper III with factor loading .7578
 Paper IV with factor loading .2683

Factor A

It will be noted that the attitude (MTAI) has loading on this factor alone, and only two other variables 'techniques of education' and 'educational psychology' have appreciable loading on it, though the loading of the former is rather poor. Factor A has only small correlations with other two factors B and C, i.e. .1935 and .1625, respectively (Table 4). This means that the variable of attitude has little to do with the present day theory courses other than those in 'educational techniques' and 'educational psychology, and the relationship with these too is not quite substantial, it is rather poor with the former, in spite of the fact that the course in educational techniques deals mainly with teaching. This does not seem to be a happy feature and should be an eye-opener for our teacher-educators, if it be recognized that the programme in the teacher training institution should primarily lead to moulding of proper attitude towards pupils and teaching. It may be said that the teachers in democratic India will also be expected to participate in educational administration and policy-making, hence, the course should be broad-based and prepare the trainees for these too. True, but should the courses for these take away such a large chunk of the total syllabus and be so ineffective in preparing teachers for their main role. Should they not be replaced by things more useful for the latter?

The investigator would not indulge in naming 'fallacy' and name Factor A, but only try to study its nature. This factor seems to do with

the understanding of the personality of the pupils and of the learning processes, which one learns in psychology and in techniques and puts to use in teaching, and one's attitude is also affected by this knowledge.

Factors B and C

If we look at the correlations between Factors B and C in Table 4, we find that they have quite an appreciable correlation, .3043, and cannot be said to be orthogonal and independent of one another. Hence, it would be difficult to separate their features altogether. Anyway, the following may be said to be the two cementing bonds between the different theory courses, that have come out as Factors B and C.

Factor B

It binds together 'principles of education', 'techniques of education' and 'school organization'. The 'techniques of education' has the highest loading in this factor, while it has rather poor loading on Factor A. Hence, B may be a factor that has little to do with the practices of education, but more with the principles of it that determine the techniques and organization of education.

Factor C

It runs through 'principles of education,' 'educational psychology,' 'modern indian education and its problems,' and 'school organization.' It seems to be a more general factor of theoretical aptitude, inclusive of memorization, in 'Indian education and its problems', which did not appear under the two former factors. It is apparently more a general factor than Factor B, because it encompasses more theory papers and seems to be more theoretically biased as it excludes the paper on 'education techniques' altogether. Because of its having a lot in common with Factor B, its correlation with it is .3043, and owing to its exclusiveness from the 'attitude', which is tied by Factor A, its correlation with Factor A is only .1625.

At the end, it will be helpful to visualize the psychological dimensions of the different theory courses in the training colleges, paper-wise.

Paper I (a) : Principles of Education

Since it does not have any loading on Factor A, which has 'attitude' with factor loadings, .4362, it seems to end by stirring only the cognitive

abilities of the students for philosophical hair-splitting. It does not simmer deep into the personality of the trainees so as to mould their attitude towards the pupils. This paper has only 0014 loadings on Factor A, while its loadings on the theoretical Factors B and C, are more than .20.

Paper I (b) : Techniques of Education

Its loadings on Factor B, which has come out to be a theoretical factor, according to the foregoing discussion, is .8145, the highest in the matrix. This is probably so because our training institutions deal with this paper only as a part of the theory course to be prepared and mugged up by the trainees for the theory examination and not in close coordination with the classroom teaching.

Paper II : Educational Psychology

The content of this paper, as prescribed in our universities today, seems to have, as one would like to say, a 'split function'. Some of it appears to be of practical importance, affecting the attitude, because of its fairly substantial loadings on Factor A, .3987, while the rest seems to be too theoretical, since its loadings on Factor C is very heavy, .7882.

Paper III : Modern Indian Education and Its Problems

The course in this paper does not seem to have any effect on the attitude of the teacher-trainees. It seems to be meant for educational administrators and policy-makers since it deals with the historical background of our educational system and its problems, which have little to do with the teacher-student relationship. Hence, its very poor loadings on Factor A, .1601, and a heavy one, .7578 on Factor C, which seems to be a general factor of a theoretical nature, is not at all surprising.

Paper IV : School Organization

One expects that with a knowledge of the principles of school organization, the attitude of the teacher-trainees would be properly moulded. The course in this paper ends with 'school organization' and has little to do with 'class organization' which is of greater concern to the teacher, the 'school organization' is more the need of the principals and headmasters.

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An Evaluation of NCC Programme with Reference to Some Characteristics

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THE education system in our country introduced during the British rule was mostly academic and confined to literacy. It did not cater to an all-round development of an individual. So after independence it was considered necessary to supplement our literacy education by training other than academic to enable the students to attain

fulfilment to both as an individual and as a social being with an awareness of his or her obligations to the nation. To meet this need NCC training programme was started in 1948 with the following motto and objectives.

The motto of the National Cadet Corps was :

DUTY AND DISCIPLINE (NOW UNITY AND DISCIPLINE)

'To obey God's orders as delivered by conscience, that is duty, to obey men's orders as issued by rightful authority, that is discipline. The foundation of both alike is denial of self for a higher good. Unless the lesson of duty be first well learned, the lesson of discipline can be imperfectly understood.'

The propounders of the NCC programme have formulated the following three objectives :

1. To develop character, comradeship, the ideal of service and capacity for leadership in young men and women.
2. To provide service training to young men and women so as to stimulate interest in the defence of the country
3. To build up a reserve of potential officers (a reserve of manpower as amended in 1965) to enable the armed forces to expand rapidly in a national emergency.

The Problem

The NCC programme has been in the service of youth in schools, colleges and universities since 1948. To ascertain the effectiveness of this programme very little efforts have been made so far. A study has been conducted on an evaluation of NCC training in development of leadership qualities among school students. In another study the effect of NCC training on physical growth, adjustment, academic achievement and certain personality traits of high school pupils have been studied. But no study has been designed so far to study the effectiveness of National Cadets Corps in relation to some characteristics of NCC cadets at college level. The investigators of this study were interested to study the effectiveness of NCC programme in natural situation. In this investigation an effort has been made to ascertain the effectiveness of NCC programme with reference to some characteristics of cadets.

The Scope

The problem of the present study has been focused to examine the effectiveness of NCC programme in terms of students' learning and training outcomes. The scope of the present study is to ascertain the effectiveness in terms of some characteristics of NCC cadets which are more probable outcomes of this programme.

In this investigation two comparable groups of the college students have been selected. One group has opted NCC training programme while another group has not offered NCC. The difference between the two groups have been studied with regard to the following variables : (i) self-concept, (ii) values, (iii) level of aspiration, (iv) adjustment problems, and (v) dependence-proneness. The case studies were also conducted on 50 ex-NCC cadets who had completed this programme. The findings of this study were highlighted by the results of case studies. Moreover, the findings of case studies were helpful in cross-validating the formulations of this investigation.

Objectives

The study was designed to achieve the following objectives :

- To evaluate the effectiveness of National Cadet Corps programme at college level with regard to self-concept, values, level of aspiration, adjustment problems and dependence-proneness.
- To conduct case studies of ex-NCC cadets to highlight the findings of the study.

Hypotheses

In the present study the following hypotheses were formulated and tested:

- There are significant differences in 'self-concepts' between NCC cadets and non-NCC college students. The hypothesis is based on the findings of the study conducted by Sinha (1966). He found that scores of NCC cadets on the leadership rating scale improve rapidly in comparison to those of non-NCC students.
- There are significant differences in 'values' between NCC cadets and non-NCC college students.

- The NCC cadets are having higher 'level of aspiration' than those of other college students who have not offered NCC.
- There are significant differences in 'adjustment' problems between NCC cadets and non-NCC college students. The hypothesis is based on the findings of the study conducted by Nair (1972). He found that NCC training has a significant influence on the development of ability for adjustment of secondary school pupils.
- There are significant differences in 'dependence-proneness' between NCC cadets and other college students.
- The science and arts NCC cadets are having similar characteristics, viz. self-concept, values, level of aspiration, adjustment and dependence-proneness.

Methodology

In the present study ex-post facto criterion group design was used to ascertain the effectiveness of NCC programme. The follow-up programme was also done for highlighting the results,

Sampling

In the present investigation stratified sampling technique was preferred. The population was composed of NCC cadets and non-NCC college students of Agra University of science and arts faculties. The researchers had selected four affiliated institutions of Agra University according to the feasibility of collecting the data and with the assumption that it may be a true representative of the population. The sample consisted of 400 cases: 200 NCC cadets (100 science cadets and 100 arts cadets) and 200 non-NCC college students (100 science students and 100 arts students). The researchers had also selected 50 ex-NCC cadets for the case study programme.

Procedure

After selecting the sample, the five standardized tests, viz. self-concept constructed and standardized by R.P. Bhatnagar, and adaptation of Allport-Vernon study of values standardized by R.P. Bhatnagar, level of aspiration constructed and standardized by Chandra Bhal Dwivedi, adjustment inventory for college students constructed and standardized by A.K.P. Sinha and R.P. Singh and D-P scale constructed and standar-

dized by J.B P. Sinha were administered on 200 NCC cadets and 200 non-NCC students of science and arts faculties in one academic year in the affiliated colleges of Agri University. The scoring of the tests was done according to test manuals.

To cross-validate the findings of the main study, 50 ex-NCC cadets were selected for case study. In the case study a self-appraisal questionnaire based on criterion measures was administered. Informations and opinions regarding family, NCC training, mental personal and social, emotional and moral characteristics were obtained.

Analysis and Treatment of Data

The statistical analysis of the data was made by applying the *t*-test for testing the significance of difference at .05 and .01 levels of confidence between NCC cadets and non-NCC college students with regard to five criterion variables. The analysis of the obtained data have been done in four phases.

A—Analysis for the difference between NCC cadets and non-NCC students of total sample with regard to five variables: The results regarding self-concept and values have been presented in Table 1.

TABLE 1
SIGNIFICANCE OF MEAN DIFFERENCE BETWEEN NCC CADETS
AND NON NCC COLLEGE STUDENTS WITH REGARD TO
TO SELF-CONCEPT AND VALUES

Variables	NCC Cadets N=200		Non-NCC Students N=200		SEMD	't' Value df=398
	Mean	SD	Mean	SD		
<i>A₁—Self-concept</i>						
a. Achievement	41.24	5.22	31.33	4.68	0.495	20.02**
b. Confidence	38.38	4.00	30.88	4.03	0.401	18.70**
c. Withdrawing tendencies	31.96	5.85	38.86	5.17	0.552	12.56**
d. Inferiority feelings	30.23	5.19	35.64	5.67	0.543	9.96**
e. Emotional instability	29.16	5.54	34.80	5.54	0.554	10.18*
<i>A₂—Values</i>						
a. Theoretical	39.07	6.10	44.03	4.67	0.543	9.13**
b. Economic	38.09	5.70	44.37	4.77	0.525	16.96**
c. Aesthetic	44.09	5.26	34.61	4.94	0.510	18.58*
d. Social	48.14	5.63	36.18	4.76	0.521	22.96**
e. Political	34.99	5.54	40.59	4.55	0.506	11.05**
f. Religious	35.44	6.58	40.33	5.89	0.624	7.82*

A—Analysis of self-concept : Five dimensions of 'self-concept' were considered for analysing the difference. The *t*-values for 'achievement' (20.02) and 'confidence' (18.70) were significant at both the levels of confidence. The mean values of NCC cadets were higher than non-NCC college students. The *t*-values for 'withdrawing tendencies' (12.50), 'inferiority feelings' (9.96) and 'emotional instability' (10.18) were also significant even at .01 level confidence. The mean values of non-NCC college students were greater than NCC cadets.

A₂—Analysis of study of values : Six dimensions of 'values' were considered for analysing the difference. The *t*-values for 'aesthetic' (18.58) and 'social' (22.96) were significant at both the levels of confidence. The mean values of NCC cadets were higher than non-NCC college students. The *t*-values for 'theoretical' (9.13) 'economic' (11.96), 'political' (11.05) and 'religious' (7.82) were also significant even at .01 level of confidence. The mean values of non-NCC college students were higher than NCC cadets.

Three more criterion variables—level of aspiration, adjustment problems and dependence proneness—were considered and their results have been provided in Table 2.

TABLE 2
SIGNIFICANCE OF MEAN DIFFERENCE OF NCC CADETS AND
NON-NCC COLLEGE STUDENTS WITH REGARD TO LEVEL
OF ASPIRATION, ADJUSTMENT PROBLEMS AND
DEPENDENCE PRONENESS

Variables	NCC Cadets N=200		Non-NCC Cadets N=200		SEMD	't' Value df=398
	Mean	SD	Mean	SD		
<i>A₁—Level of aspiration</i>	1.32	0.98	0.27	1.31	0.116	11.17**
<i>A₂—Adjustment</i>						
a. Home	5.69	2.44	3.48	1.99	0.222	9.95**
b. Health	2.54	1.69	6.73	2.34	0.204	20.53**
c. Social	3.63	2.10	7.48	2.11	0.21	18.36**
d. Emotional	9.08	3.08	6.41	1.88	0.255	10.45**
e. Educational	5.70	2.21	5.13	3.02	0.264	2.16*
<i>A₃—Dependence- Proneness</i>	67.01	6.56	76.91	9.29	0.804	12.31**

A₃—Analysis of level of aspiration : To ascertain the difference analysis of 'level of aspiration' was done. The *t*-value for 'level of aspiration' (11.17) was significant at both the levels of confidence. The mean value of NCC cadets was greater than non-NCC college students.

A₄—Analysis of adjustment problems : Five areas of 'adjustment' problems were considered for analysing the difference. The *t*-values for health (20.53) and 'social' (18.36) were significant even at .01 level of confidence. The mean values of non-NCC college students were greater than NCC cadets. The *t*-values for 'home' (9.95) and 'emotional' (10.45) were significant at both the levels of confidence. The mean values of NCC cadets were higher than non-NCC college students. The *t*-value for 'educational' (2.16) was significant at .05 level of confidence and not significant at .01 level of confidence. The mean value of NCC cadets was greater than non-NCC college students.

A₅—Analysis of dependence-proneness : To find out the difference analysis of 'dependence-proneness' was carried out. The *t*-value for 'dependence-proneness' (12.31) was significant at both the levels of confidence. The mean value of non-NCC college students was greater than NCC cadets.

Similar type of analysis was done for the following groups :

B—NCC cadets of science and non-NCC college students of science with regard to five variables

C—NCC cadets of arts and non-NCC college students of arts with regard to five criterion

The results obtained for the above two categories were consistent with the results obtained on the total sample of subjects.

D—Analysis for the difference between NCC cadets of science and NCC cadets of arts with regard to five variables

D₁—Analysis of self-concept : Five dimensions of 'self-concept' were considered for analysing the difference. The *t*-values were not found significant in any dimension of 'self-concept'.

D₂—Analysis of study of values : Six dimensions of 'values' were considered for analysing the difference. The *t*-values for 'theoretical', 'economic', 'aesthetic' and 'political' were not found significant at any level of confidence. The *t*-value for 'social' (2.08) was found significant at .05 level of confidence. The mean value of NCC cadets of arts was greater than NCC cadets of science. The *t*-value for 'religious' (2.15) was found significant only at .05 level of confidence. The mean value of NCC cadets of science was higher than NCC cadets of arts.

D₃—Analysis of level of aspiration : To find out the difference analysis of 'level of aspiration' was done. The *t*-value for 'level of aspiration' (3.58) was found significant at both the levels of confidence. The

mean value of NCC cadets of arts is greater than NCC cadets of science.

D₄—Analysis of adjustment problems : Five areas of 'adjustment' problems were considered for analysing the difference. The *t*-value for 'home' (5.08) was found significant at both the levels of confidence. The mean value of NCC cadets of arts is greater than NCC cadets of science. The *t*-values were not found significant in 'health', 'social', 'emotional' and 'educational' areas of 'adjustment' problems.

D₅—Analysis of dependence-proneness : To ascertain the difference analysis of 'dependence-proneness' was carried out. The *t*-value was not found significant at any level of confidence.

Case Study of Ex-NCC Cadets

Case studies of 50 ex-NCC cadets were also conducted to highlight the results regarding the effectiveness of NCC programme. The attitude coefficients for mental, personal and social, emotional and moral dimensions were obtained as .93, .83, .84 and .95, respectively. It may be stated that ex-NCC cadets expressed most favourable attitude towards the objectives of NCC programme.

Findings

In view of the analysis of the data and the discussion of the results the following conclusions may appear tenable :

1. SELF-CONCEPT

- NCC cadets have higher 'achievement' self-concept and higher 'confidence' self-concept than non-NCC college students.
- It appears that non-NCC college students have higher 'withdrawing tendencies', 'inferiority feelings' and 'emotional instability' than NCC cadets.
- It appears that there is no difference between NCC cadets of science and NCC cadets of arts with regard to 'achievement', 'confidence', 'withdrawing tendencies', 'inferiority feelings' and 'emotional instability' dimensions of self-concept.

2. VALUES

- NCC cadets appear to have higher 'aesthetic' values and higher 'social' values than non-NCC college students.
- Non-NCC college students seem to have higher 'theoretical' values, higher 'economic' values, higher 'political' values, and higher 'religious' values than NCC cadets.

- NCC cadets of science and NCC cadets of arts appear to have no significant difference in four dimensions of values, viz. 'theoretical', 'economic', 'aesthetic' and 'political'.
- It appears that NCC cadets of arts have higher 'social' values than NCC cadets of science.
- It seems that NCC cadets of science have greater 'religious' values than NCC cadets of arts.

3. LEVEL OF ASPIRATION

- It seems that NCC cadets have higher 'level of aspiration' than non-NCC college students.
- NCC cadets of arts appear to have higher level of aspiration than NCC cadets of science.

4. ADJUSTMENT PROBLEMS

- It seems that NCC cadets have greater adjustment problems than non-NCC college students in 'home', and 'emotional' areas.
- Non-NCC college students have greater adjustment problems than NCC cadets in 'health' and 'social' areas.
- It seems that NCC cadets of arts have greater adjustment problems than NCC cadets of science in 'home' area. No significant differences exists in both the groups in adjustment problems in 'health', 'social', 'emotional' and 'educational' areas.

5. DEPENDENCE-PRONENESS

- Non-NCC college students appear to have more dependence-proneness than NCC cadets.
- NCC cadets of science and NCC cadets of arts seem to have no significant difference in dependence-proneness.

Findings of Follow-up Programme

The follow-up study findings support and validate the formulations of the main study. Some specific conclusions may be drawn :

- Some mental qualities may be developed through the training of NCC.
- Personal and social qualities may be acquired through this programme.
- It may develop the capacity of emotional stability.
- The self-appraisal data of ex-NCC cadets through the case studies provide some evidences regarding the objectives of NCC training programme.

The following objectives may be achieved by this programme :

- Develop the high character among cadets
- Develop the feelings of comradeship
- Develop the capacity of leadership
- Develop the capacity of emotional stability
- Develop the moral integrity among cadets.

It is the hope of the investigators that the findings of the study provide new information in the domain of co-curricular programme in the field of education.

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Anxiety and Achievement : A Rorschach Study of High-and-Low-Achievers

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SINCE the development of the amorphously structured ten symmetrical fields of stimulation (ink-blot) by Hermann Rorschach, a Swiss psychiatrist, it has been widely used by the researchers inside and outside the laboratory. In terms of the number of agencies using it all over the world, Rorschach scored second to WAIS (Lubin, Wallis and Paine 1971). Both Neuringer (1962) and Goldfried (1966) in their reviews concluded that Rorschach was quite apt and useful in measuring the personality trait of anxiety. But anxiety as a transitory state (A-State) should be distinguished from its reference to as a relatively stable personality trait (A-Trait). Spielberger (1966) remarks that A-State refers to a temporary emotional reaction that is caused by the activities of autonomic nervous system (i.e. blood pressure, galvanic skin response, etc.) and characterized by feelings of apprehension and tension. A-Trait is a stable personality trait in which the individual perceives a variety of stimulus conditions as dangerous or threatening and responds to them accordingly.

The Zuckerman (1960) Affect Adjective Check List (AACL) and A-State scale of the State-Trait Anxiety Inventory of Spielberger, Gorsuch and Lushene (1971) belong to A-State measures. In A-Trait measures are included the Taylor (1953) Manifest Anxiety Scale (TAMS), IPAT Anxiety Scale (Cattell 1957), etc. In the Rorschach, the shading, texture and associated chromoscuro variables are the indicators of the state of anxiety in the individual. In the present paper an attempt has been made by the investigators to explore the state of anxiety (general anxiety and anxiety concerning bodily functions) in the high and low-achieving school-going adolescents on the basis of the criteria developed by Carstairs, *et al.* (1960) with Indian samples.

Objectives

The present investigation was undertaken with the following main objectives :

1. To investigate and differentiate the state of anxiety (general anxiety as well as anxiety concerning bodily functions) between the high and low-achieving adolescents.
2. To find out sex difference in the possession of both types of anxiety.

Hypotheses

Before the collection of data it was hypothesized that :

1. There will be difference in the state of anxiety between high and low-achievers.
2. Low-achievers and girls will possess higher state of anxiety than the high-achievers and boys, respectively.

Method

Sample : The ink-blot tests were given to a final sample of 60 Class X students (out of an initial random sample of 520) matched on age (14+), grade (Class X), sex and socio-economic status (middle SES matched on mean and SD of SES scores). On the basis of intelligence and academic achievement scores, the 60 students were divided into four equal groups : high-achieving boys (HAB), low-achieving boys (LAB), high-achieving girls (HAG), and low-achieving girls (LAG). The Rorschach test was administered individually to all the students and the average time taken by each student ranged between half an hour to one and a half hours.

Tools : To find out the four high and low-achieving groups Raven's (1956) progressive matrices and the academic achievement of students in their last annual examinations were used. Matching on socio-economic status was done with the help of Rao's (1977) socio-economic status rating scale. And to study the pattern of anxiety with four groups the RIBT (Rorschach ink-blot test) was administered to the students and the method of Klopfer, *et al.* (1956) was followed for scoring and interpretation.

Analysis of Data

The Rorschach criteria of KF (form entering depth or diffusion impression) and kF (three-dimensional expanse projected on a two-dimensional plane) and anatomical responses given by Casteans, *et al.*, (1960) for Indian samples were considered for measuring the status of anxiety in the adolescents. The analyses of data on the basis of the two criteria for achievement difference and sex difference in general anxiety have been presented in Tables 1 and 2, respectively.

TABLE 1
ACHIEVEMENT DIFFERENCE IN LEVEL OF GENERAL ANXIETY

<i>Rorschach criteria</i>	<i>Group</i>	<i>High Ach.</i>	<i>Low Ach.</i>	<i>df</i>	<i>Chi- square</i>
KF	Boys	3.00	13.00	1	5.06**
	Girls	6.00	3.00	1	0.44*
	Boys and Girls	4.50	8.00	1	0.50*
kF	Boys	1.00	6.00	1	2.28*
	Girls	7.00	16.00	1	2.78*
	Boys and Girls	4.00	11.00	1	2.40*

*Not Significant **Significant at .05 level

From Table 1 it is quite evident that on the basis of the Rorschach criterion KF, the chi-square value between the boys of two groups is significant at .05 level. All other chi-square values either on the basis of KF or of kF are not found significant. It is concluded that the LAG group possesses more general anxiety than the other three groups. Though the chi-square values on Rorschach criterion kF were insignificant, still it is clear that the LAG group has got high level of general anxiety than that of LAB.

The chi-square value of sex difference on the Rorschach criterion KF is significant at .05 level for the low-achieving group. This indicates that the low-achieving boys have higher level of general anxiety than the low-

TABLE 2
SEX DIFFERENCE IN LEVEL OF GENERAL ANXIETY

<i>Rorschach criteria</i>	<i>Group</i>	<i>Boys</i>	<i>Girls</i>	<i>df</i>	<i>Chi- square</i>
KF	HA	3.00	6.00	1	0.22*
	LA	13.00	3.00	1	5.04**
	HA & LA	8.00	4.50	1	0.50*
kF	HA	1.00	7.00	1	3.12*
	LA	6.00	16.00	1	3.68*
	HA & LA	3.50	11.50	1	3.26*

*Not Significant **Significant at .05 level

achieving girls. The analyses of data on 'anxiety concerning bodily functions' for achievement and sex differences have been presented in Tables 3 and 4, respectively.

TABLE 3
ACHIEVEMENT DIFFERENCES IN ANXIETY CONCERNING BODY
FUNCTIONS

<i>Rorschach criterion</i>	<i>Group</i>	<i>High Ach.</i>	<i>Low Ach.</i>	<i>df</i>	<i>Chi- square</i>
Anatomical Responses	Boys	30.00	31.00	1	0.02*
	Girls	45.00	22.00	1	7.22**
	Boys and Girls	36.50	26.50	1	1.28*

* Not Significant ** Significant at .01 level

It is found from Table 3 that the chi-square value on Rorschach criterion—
anatomical responses—in case of girls is significant at .01 level and all
other groups are found insignificant. It is concluded that the high-achieving
girls are more anxious regarding their bodily functions. Though there
was no significant difference between the high-achievers and the low-
achievers and the low-achievers as a whole, still it is found that the high-
achievers in general have more anxiety concerning their bodily functions.

TABLE 4

SEX DIFFERENCE IN ANXIETY CONCERNING BODILY FUNCTIONS

<i>Rorschach criterion</i>	<i>Groups</i>	<i>Boys</i>	<i>Girls</i>	<i>df</i>	<i>Chi-square</i>
Anatomical Responses	HA	30.00	45.00	1	2.62*
	LA	31.00	22.00	1	1.20*
	HA & LA	30.50	33.50	1	0.06*

*Not significant

Table 4 shows that there is no significant sex difference in the personality trait 'anxiety concerning bodily functions' between boys and girls of either high-achieving or low-achieving group. Even, in general, boys do not differ significantly than girls in this type of anxiety. However, from the anxiety scores of different groups it is clear that the high-achieving girls have more anxiety concerning their bodily functions than all the other three groups.

Discussion

From the analysis of data presented in the preceding four tables, it is clear that the low-achieving boys have high level of general anxiety. Even the low-achievers taken together (irrespective of sex) are more anxious than the high-achieving adolescents. It is also found that the girls in general (irrespective of achievement level) possess more anxiety than boys. The consideration of F responses crossing 80 per cent is not fulfilled in any of the four groups that would have justified their higher level of anxiety. At the time of administering the test it was also noted that most of the low-achieving boys, girls in general and low-achievers in general, had large variation in their reaction time (in responding the ink-blot). Furthermore, the criterion of FM (animal movements) > M (human movements) responses is justified only in case of the low-achievers in general (FM : M=11.54 : 6.97). Most of the low-achievers and girls had expressed disturbed reaction to the colour portions of some of the ink-blot presented to them at the time of testing. Moreover, lowered form level was found in case of girls and low-achievers from their psychograms prepared separately.

The high-achieving girls are found to have more anxiety only concerning their bodily functions whereas they do not differ significantly from the other groups in the personality disposition of general anxiety. The former type of anxiety and tension found in them may form a natural part of the process of growth and development at this stage of adolescence and puberty. The fact of low-achievement in case of both boys and girls may be due to the presence of high level of anxiety in them. Though the low-achievers in general and low-achieving boys in particular are found to be superior in their emotional construction (depicted by the Rorschach criteria of F%, M, and 2 Sum C), however, girls in general are quite lacking a well-balanced emotional construction and stability. So in the schools sufficient care is to be given to the emotional and anxiety aspects of child's personality, for the adolescence is the period of stress and strain.

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Error Analysis in Mathematics at the S.S.C. Examination

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WHETHER the purpose be admission or certification, promotion or classification, examinations have come to occupy a unique position in the system of education. As a result, the real place of examinations, viz. to provide feedback to the instructional system, is lost sight of. The emerging concept of evaluation as the process of obtaining and using information with a view to improve rather than prove the abilities and attainments of the pupils, has brought about the significant change in the role of examination. Apart from measuring how much the pupil has achieved, the examination is also expected to provide feedback to the instructional system as to what has been achieved and what is to be achieved. Analysis of errors committed by pupils in

various subjects of public examination is a potential source of feedback to the pupils and teachers in the improvement of classroom instruction and revision of curriculum.

Error analysis in various subjects was undertaken by Singh and Misra* 1979, Central Examination Unit 1953, DBPSB 1963, Pareek and Sisodia 1972, Pareek and Bahukhandi 1974, Pareek and Manot 1974, Pareek and Shrivastava 1974, U.P. Board 1976, Rajashekhar 1978. The present study is sequel to the problem of failures in mathematics at the SSC examination, March 1979, conducted by the Goa, Daman and Diu Board of Secondary and Higher Secondary Education.

Objectives

- 1 To conduct item analysis with a view to identify the difficult topics in mathematics in Class X.
2. To analyse the errors committed by students in solving each question, topicwise.

Sample

The sample chosen for the study consisted of every fiftieth answer paper in algebra and geometry at the SSC examination, March 1979. Answer papers (136) hence drawn were arranged in serial order of merit. The top 50 papers constituted the upper group while the bottom 50 papers constituted the lower group. These papers were utilized for item analysis and computation of difficulty value and discrimination index. The performance of both upper and lower group students was considered in respect of each item in analysing the errors.

Significant Findings and Discussion

Item analysis in algebra : The question paper in mathematics (algebra and geometry) consists of nine questions out of which the candidates are required to attempt seven questions. The first question being compulsory consists of objective/very short answer questions carrying 15 marks and the remaining questions are of 10 marks each. The result of item analysis is tabulated in the form of questionwise analysis chart (Table 1)

*Pritam Singh and R.G. Misra, Research on examinations—A retrospect and prospect. Background paper presented at the National Conference on Examinations held at Nagpur, 15-17 Feb. 1979

which indicates the difficulty level and the discrimination index of each item. The items with difficulty value below 0.30 have been scaled as difficult items (A level), with difficulty value 0.30 to 0.70 have been scaled as average items (B level) and with difficulty value 0.71 and above have been scaled as easy items (C level). It is evident that the question paper in algebra is leaned towards difficult items (Table 2). There are 16 (33 per cent) difficult items in contrast with 3 (3 per cent) easy items. The question paper appears to be in favour of students belonging to upper group.

The topics in algebra which were attempted successfully by students in smaller numbers are (Table 3) variation (9 per cent), ratio and proportion (12.5 per cent), graph (28.5 per cent) and rational algebraic expression (37 per cent). This holds good in respect of both the groups. The topic polynomials is attempted by largest number (63.3 per cent), out of which 29.2 per cent of the students were successful.

TABLE 1
QUESTIONWISE ANALYSIS IN ALGEBRA

Sr. No.	Item No.	Topic	Obj.	Form of Q.	Marks	Diff. value	Level	Discr Index
1.	1 A i	Graph	U	O	1	.64	B	.36
2.	1 A ii	Ratio and Prop.	U	O	1	.33	B	.28
3.	1 A iii	Variation	A	O	1	.22	A	.00
4.	1 b i	Logarithm	U	O	$\frac{1}{2}$	.46	B	.52
5.	1 b ii	Graph	U	O	$\frac{1}{2}$	.53	B	.58
6.	1 b iii	Polynomial	K	O	$\frac{1}{2}$	.79	C	.22
7.	1 b iv	Logarithm	K	O	$\frac{1}{2}$	.70	C	.46
8.	1 c i	Polynomial	U	VSA	1	.26	A	.48
9.	1 c ii	Polynomial	U	"	1	.20	A	.34
10.	1 c iii	Ratio and Prop.	U	"	1	.21	A	.34
11.	1 c iv	Indices	K	"	1	.54	B	.62
12.	1 c v	Logarithm	K	"	1	.40	B	.36
13.	1 c vi	Logarithm	U	"	1	.38	B	.44
14.	1 c vii	Variation	U	"	1	.46	B	.58
15.	1 c viii	Sim. Eqn.	U	"	1	.26	A	.32
16.	1 c ix	Rational Alg. Exp.	U	"	1	.14	A	.16
17.	1 c x	Eqn.	U	"	1	.50	B	.64
18.	2 a i	Equation	U	SA	3	.54	B	.66

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19.	a ii	"	U	"	3	.50	B	.34
20.	a iii	"	U	"	3	.57	B	.62
21.	b i	"	A	"	4	.42	B	.26
22.	b ii	"	A	"	4	.18	A	.12
23.	3 a i	Sim Eqn.	U	"	3	.50	B	.72
24.	a ii	"	U	"	3	.20	A	.04
25.	a iii	"	U	"	3	.63	B	.70
26.	b i	"	A	"	4	.18	A	.20
27.	b ii	"	A	"	4	.33	B	.10
28.	4 a	Logarithm	U	SA	3	.30	B	.34
29.	b i	"	U	"	2	.53	B	.42
30.	b ii	"	U	"	2	.33	B	.16
31.	c	"	A	"	2	.33	B	.36
32.	d	"	A	"	3	.44	B	.32
33.	5 a	Indices	U	"	4	.51	B	.76
34.	b i	"	U	"	2	.46	B	.30
35.	b ii	"	U	"	2	.58	B	.46
36.	c i	"	U	"	1	.54	B	.26
37.	c ii	"	U	"	1	.36	B	.46
38.	c iii	"	U	"	1	.15	A	.14
39.	d	"	A	"	2	.47	B	.48
40.	6 a i	Polynomials	U	SA	3	.74	C	.74
41.	a ii	"	U	"	3	.65	B	.66
42.	a iii	"	U	"	3	.25	A	.04
43.	b	"	U	"	2	.35	B	.54
44.	c	"	U	"	2	.30	B	.38
45.	7 a	Rational Alg. Exp.	U	"	4	.39	B	.26
46.	a ii	"	U	"	4	.25	A	.14
47.	b	Polynomials	U	"	3	.35	B	.52
48.	c	"	U	"	3	.52	B	.54
49.	8 a	Graphs	SK	"	5	.22	A	.10
50.	b	Ratio and Prop.	U	"	3	.31	B	.12
51.	c	Variation	U	"	2	.10	A	.02
52.	9 a	Graphs	U	"	5	.23	A	.12
53.	b	Variation	A	"	3	.11	A	.02
54.	c	Ratio and Prop.	U	"	2	.33	B	.04

Objectives:

K—Knowledge
U—Understanding
SK—Skill
A—Application

From of Questions

O—Objective
VSA—Very Short Answer
SA—Short Answer

Diff. Level

A—Difficult
B—Average
C—Easy

The topics on variation, ratio and proportion find place in the syllabus of Class X after a gap of two years. The topic on graphs is found in the syllabus of Class VIII. It recurs in Class X after a gap of one year. The other topics such as equations, simultaneous equations, indices, polynomials are laid down more or less in concentric manner in the secondary block. Hence there is reason to believe that the students perform better when the topics are concentrically arranged in the syllabus.

The students of upper group always attempt more number of questions. However, in respect of the topic on graphs the lower group students (18 per cent) have excelled upper group (10.5 per cent). However, only .05 per cent of them were successful in that topic. The lower group students are tempted to attempt this topic, perhaps because it is a skill-based topic.

TABLE 2
DISTRIBUTION OF MARKS ACCORDING TO DIFFICULTY LEVEL
(ALGEBRA)

Sr. No.	Diff. Level	No. of Items	Marks	Percentage
A	Difficult	16	40	33
B	Average	35	77	64
C	Easy	3	4	3
	Total	54	121	100

TABLE 3
TOPICWISE PERFORMANCE OF STUDENTS IN ALGEBRA

Sr. No.	Topic	Av. No. of Students Attempted			Av. No. of Students Succeeded		
		U.G.	L.G.	T	U.G.	L.G.	T
1.	Equation	28.4	16.6	45	20.6	0.60	21.2
2.	Sim. Eqn.	28.4	22.6	51	20.4	2.08	23.2
3.	Graph	10.5	18.0	28.5	6.00	0.05	06.5
4.	Indices	33.4	19.2	52.7	21.4	1.00	22.4
5.	Logarithm	28.4	17.6	46.0	16.6	1.00	17.6
6.	Polynomials	37	26.3	63.3	26.8	2.04	29.2
7.	Rational Alg.						
	Exp.	21.5	15.5	37	11.0	1.00	12.0
8.	Ratio and Prop.	7	05.5	12.5	4.0	0	4.00
9.	Variation	05.5	03.5	09.0	01.0	0	1.00

Error Analysis in Algebra

1. The type of errors committed by upper and lower group students differs. The upper group students make computational mistakes only, whereas the lower group students show lack of understanding of basic concept in all topics. Computational mistakes are more frequent. The solutions they offer lack perception of goal and hence often become absurd. They are more confused by topics involving similar concepts.
2. The students showed repeated lapses in putting signs. The negative numbers created more problems. This suggests that properties of operations on numbers, a topic now dealt in Class VIII, needs special emphasis.
3. The performance of students in solving problems on equation and simultaneous equation revealed that the students lacked basic skill in framing equations. Once the equation is framed the solution becomes mechanical. However, the lower group students lacked skill in factorizing the quadratic equation. They also failed to identify appropriate method to reduce one unknown in case of simultaneous equation. While adding or subtracting equations mistakes are committed on account of signs.
4. The answers in respect of indices and logarithms evidenced a lot of confusion in the mind of students regarding the laws. A sound foundation of the laws of indices and logarithms and a comparative approach to point out their similarities and difference is necessary in order to overcome the confusion.
5. The students' solution in respect of polynomials revealed that polynomials are mixed up with quadratic trinomials. Further the students could not effectively apply the tests for diagnosing the factors. Another hurdle for students was to write the polynomial in coefficient form before attempting synthetic division. Many of them omitted zero which is a constant term.
6. While solving questions on rational algebraic expression, the students committed mistakes in putting signs while opening the brackets. When a term or a numeral is not given in fractional form, they failed to realize that the denominator was one. Similar type of mistakes occurred in solving equations involving rational expression.

TABLE 4
QUESTIONWISE ANALYSIS IN GEOMETRY

Sr. No.	Item No.	Topic	Obj.	Form of Q.	Marks	Diff. value	Level	Discr. Index
1.	1 a i	Pyth. theorem	U	O	1	.52	B	.28
2.	1 a ii	Circle-arc	K	O	1	.76	C	.24
3.	1 a iii	Pyth. theorem	U	O	1	.66	B	.24
4.	1 a iv	Trigonometry	U	O	1	.54	B	.40
5.	1 a v	Pl. Coord. G	U	O	1	.69	B	.54
6.	1 b	C.C. area	K	O	3	.63	B	.34
7.	1 c i	Pl. Coord. G	K	VSA	1	.55	B	.72
8.	1 c ii	C. C. area	U	;	1	.32	B	.28
9.	1 c iii	Pl. Coord. G	U	..	1	.43	B	.58
10.	1 c iv	Pyth. theorem	U	..	1	.48	B	.34
11.	1 c v	Circle-arc	U	..	1	.37	B	.48
12.	1 c vi	Similarity	U	..	1	.28	A	.32
13.	1 c vii	Circle-arc	U	..	1	.37	B	.26
14.	1 c viii	Similarity	U	..	1	.84	C	.10
15.	1 c ix	Trigonometry	K	..	1	.62	B	.44
16.	1 c x	C.C. area	A	;	1	.07	A	.06
17.	2 a	Area	U	SA	3	.54	B	.44
18.	2 b	Pyth. theorem	U	..	4	.36	B	.46
19.	2 c	Circle-arc	A	..	3	.27	A	.32
20.	3 a	Circle-arc	K	..	4	.71	C	.32
21.	3 b	—do—	U	;	3	.46	B	.48
22.	3 c	—do—	A	..	3	.12	A	.14
23.	4 a	C.C. area	U	..	3	.30	B	.26
24.	4 b	—do—	U	..	3	.46	B	.34
25.	4 c	—do—	A	..	4	.26	A	.22
26.	5 a	Geom. Constr.	SK	..	3	.63	B	.40
27.	5 b	—do—	SK	..	3	.71	C	.34
28.	5 c	—do—	SK	;	4	.58	B	.48
29.	6 a	Similarity	U	..	4	.43	B	.24
30.	6 b	—do—	U	..	3	.83	C	.07
31.	6 c	—do—	U	;	3	.86	C	.02
32.	7 a	Trigonometry	K	..	3	.44	B	.56
33.	7 b	—do—	U	..	3	.54	B	.56
34.	7 c	—do—	U	..	2	.67	B	.62
35.	7 d	—do—	U	..	2	.60	B	.46
36.	8 a	Pl. Coord. G	U	..	3	.56	B	.58
37.	8 b	—do—	U	..	3	.59	B	.70
38.	8 c	—do—	U	..	4	.61	B	.64
39.	9 a	Similarity	U	..	2	.28	A	.22
40.	9 b	Pyth. theorem	U	..	4	.60	B	.38
41.	9 c	C.C. area	A	..	4	.36	B	.18

7. In case of questions on ratio and proportion and variation the students showed lack of knowledge of basic properties. Attempts were made to solve the problems without applying the properties.
8. In questions on graphs, the students could not work out the values of one variable by simple substitution in the given equation. The skill shown in drawing graphs was barely minimum. Many students from the lower group drew 'x' and 'y' only. Those who knew something more, either straight lines (often intersecting) or scribbled a parabola in anticipation of a mark by chance. The topic graph needs to be recognized to make it more interesting and meaningful.

Item analysis in geometry. The question-wise analysis of the geometry paper is given in Table 4. The students considered (Table 5) 6 items as difficult (A type) and same number of items as easy type (C-type). The remaining 29 questions were considered as average (B type). Thus overall difficulty level of the question paper in geometry is low when compared with that of algebra. The performance of the students did not fluctuate much among various topics in geometry (Table 6). However, topics on geometrical constructions and plane co-ordinate geometry were considered as easy, whereas circle-circumference-area and similarity were considered difficult by the students.

Error Analysis in Geometry

1. The topic 'area' received relatively good response from the students. However, the students from the lower group failed to recall the formula perhaps because the topic is taught in Class IX and the revision done in Class X is not adequate for them.
2. While solving a problem based on Pythagoras theorem, the lower group students failed to identify as to which is the opposite side and which is hypotenuse.
3. The problem on circle-arc and circle-circumference and area often require application of Pythagoras theorem, which is conspicuously lacking in students especially while giving the proofs. It is necessary to adopt correlation approach. While

dealing with the problems on Pythagoras theorem the examples could be drawn from the topics 'circle-arc' and 'circle-circumference-areas', so that there is reinforcement of the concept. Another weak point noticed in this topic is lack of perception of relationship between central angle, the inscribed angle and the measure of arc. In the calculation of the area of a shaded region which involves two geometrical figures the students failed to perceive the relationship existing between them. In general the performance of the students is found to be better wherein there is cramming of formulae rather than applying the same in a new situation.

4. Examination of students' construction of geometrical figures revealed that construction was not a problem for them. But the skill shown in construction was not adequate. Hence it is necessary to give more experience to the students in handling geometrical instruments and drawing geometrical figures.
5. The students' knowledge of the trigonometrical ratios is satisfactory. However, applying the same to solve problems was a hurdle for them.
6. The problem on plane coordinate geometry did not attract the attention of lower group students. The solutions showed that they lack knowledge in finding coordinates. Some had confusion in substituting the values of 'x' and 'y' in the required formula.

TABLE 5

DISTRIBUTION OF MARKS ACCORDING TO DIFFICULTY LEVEL
(GEOMETRY)

<i>Sr. No.</i>	<i>Diff. Level</i>	<i>No. of Items</i>	<i>Marks (Approx. percentage also)</i>
A	Difficult	6	14
B	Average	29	69
C	Easy	6	15
Total		41	98

TABLE 6
TOPICWISE PERFORMANCE OF STUDENTS IN GEOMETRY

Sr. No.	Topic	Av. No. Students Attempted			Av. No. Students Succeeded		
		U.G.	L.G.	T	U.G.	L.G.	T
1.	Area	36	37	73	31	9	44
2.	Pythagoras theorem	40.4	38.4	78.8	27.8	12.4	40.2
3.	Circle-arc	39.6	37.6	77.2	26.6	10.5	37.1
4.	Circle-circumference area	30.0	25.1	55.1	16.6	4.7	21.3
5.	Similarity	25.5	27.1	52.6	15.9	9.7	25.6
6.	Geom. constructions	43.3	39.0	82.3	33.3	15.0	46.3
7.	Trigonometry	41.3	27.3	68.6	32.1	7.0	39.1
8.	Pl. coordinate geometry	46.6	30.3	76.9	38.0	6.5	44.5

F.C.

Conclusion

It can be inferred from the investigation that error analysis is atleast one of the feedback devices at the public examinations. The findings of the study have implications in the improvement of instruction and in view of syllabi. For a long time mathematics teaching has been mechanical and routine. It is time to make it more meaningful and interesting specially to the educationally weaker sections. Meanwhile reorganization of mathematics curriculum with a view to make it more relevant and logical is also an immediate assignment for our curriculum researchers.

□

Theory into Practice :
An Analysis of B.Ed. Theory and Practice Marks

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PHILOSOPHERS of education (Bayles 1962, Scheffler 1965 and Peters 1970) have time and again stated or suggested that a theory is or ought to be a guide to educational practice. The educational theory-practice relationship is to be looked as symbiotic. The basic premises of theory as illustrated by various definitions and descriptions is primarily that of a logical framework. Thus, theory consists of classes of statements and rules for their manipulation. In contrast practice has been reflected as a process involving actions based upon habit, art, skill, or strategy. Practice, thereby implies a practitioner. Practitioners may, in varying degrees, utilize knowledge, make decisions, set aims or objectives, and devise ways and means for performing tasks. Therefore, practice has outcomes or consequences (Hyman 1971).

Researches collected by Wallen and Travers (1960) make depressing reading, which supports lack of evidence between theory and practice. It was in this reference that Saiyidan (1934) long back lamented : the divorce of theory from practice is one of the serious defects of training colleges education and, unless it is removed, its effectiveness will continue to be questionable indeed. This state of art, therefore, demands that practice and theory must both be visualized as growing entities : theory illuminating practice and pointing the direction of its progress ; practice constantly modifying, reinterpreting and strengthening theory, and checking its tendency to become mere persiflage. In short, mere theoretical knowledge is no guarantee for practical skills. There is no denying the fact that knowing theory is a necessary condition for teaching but it does not mean that theory implies practice, or that only knowledge of theory is a sufficient condition for successful practice. In view of this conflicting position the present study is an attempt to study the relationship between theoretical methodology and teaching practice marks.

Purpose

The major purpose of this study was to compare the theory marks (one methodology subject) with the teaching practice marks of that very subject of a group of B. Ed. students. More specifically, the present study seeks evidence to the following questions :

1. To what extent do external theory marks (methodology) predict external practice, internal practice and total practice teaching marks ?
2. To what extent internal theory marks (methodology) are able to predict external practice, internal practice and total practice teaching marks.
3. To what extent do total theory marks (methodology) predict external practice, internal practice and total practice and total practice teaching marks.

Sample

The sample of this study constituted 65 students of the Regional College of Education, Ajmer. These students appeared for their university examination in the year 1980-81. The theory marks obtained in one methodology paper (Hindi) were taken as predictor marks for the B. Ed. students in this study, while these were further studied as external theory marks, internal theory marks and total theory marks obtained at the university examination. The criterion variables were external practice marks, internal practice marks and total practice marks obtained in the final practice teaching examination.

Results and Discussion

The following two tables summarize the various statistics of the predictor variable and the criterion. For the sake of convenience the predictor and criterion variables have been denoted as external theory (ET), internal theory (IT), total theory (TT), external practice (EP), internal practice (IP) and total practice (TP).

The predicting power of one variable (theory marks) depends on its capacity to forecast other variable (practice marks). It is a function of correlation. If the correlation between theory marks and practice marks were perfect, one could make the prediction of practice marks (teaching success in other words) from theory marks confidently. On the other

TABLE 1

STATISTICS OF THE PREDICTOR VARIABLES AND THE CRITERION

	ET	IT	TT	EP	IP	TP			
Mean	50.11	71.42	60.46	57.78	60.16	59.20			
SD	6.28	13.34	8.60	4.26	7.31	5.17			
r	14→.20	15→.16	16→.23	24→.34	25→.23	26→.37	34→.32	35→.34	36→.35
k	.98	.99	.95	.94	.95	.93	.95	.87	.94
E	2%	1%	5%	6%	5%	7%	5%	3%	6%
r ²	.04	.03	.05	.12	.05	.14	.10	.06	.12
	(4%)	(3%)	(5%)	(12%)	(5%)	(14%)	(10%)	(6%)	(12%)

hand if correlation were zero, prediction would be futile. Between these limits, predictions are possible with varying degree of accuracy (Garret 1953). Now, from an examination of Table 1, it is obvious that the relationship between the theory marks and practice marks (in all categories) varies between .16 to a low but positive relationship of .37. Therefore, since the correlation (r) between the theory marks and practice marks is very low, the error of prediction is necessarily small.

Again, the most helpful method of stating the degree of relationship indicated by a given value of the coefficient, is by means of coefficient of alienation ($k = \sqrt{1 - r^2}$) and the index of forecasting efficiency ($E = (1 - \sqrt{1 - r^2}) 100$), and the coefficient of determinism (r^2). It will be noted from Table 1 that the coefficients of alienation (k) are large, they vary between .93 to .99. This clearly shows that the degree of a lack of relationship between the theory and practice marks is large. It is worthwhile to add here the observation of Garrett (1953) that "for r 's of .80 or less, the coefficients of alienation are clearly so large that the prediction of the individual scores based upon the regression equation are little better than 'guesses'". Again, since the correlation between the theory marks and practice marks (all categories) is very low the index of forecasting efficiency, which is the percentage reduction in error of prediction by reason of correlation between the two variables, is also small.

It would be interesting to determine the percentage of variance in practice marks that is associated with or determined by variance in the theory marks. An examination of Table 1 for this sample shows that only 3 per cent, 4 per cent, 5 per cent, 6 per cent, 10 per cent, 12 per cent and 14 per cent of variance of the different categories of practice

marks is determined by the theory marks obtained in the methodology paper. The rest of the percentage of variance in practice marks, which vary from a maximum of 97 per cent to a minimum of 86 per cent in the different categories of practice teaching marks are unaccounted for.

The prediction is also made by the regression equations and the regression lines which are an index of prediction. These equations predict the most likely scores in practice teaching from the scores in the theory (methodology) paper. Regression equations for each category of the practice marks were formulated by using the formula :

$$Y' = r \times y \frac{\sigma_y}{\sigma_x} (X - M_x) + M_y$$

with the usual notations Y' standing for the practice marks and X for the theory marks. Interpreting these regression equations it can be said that Y' (in all the nine categories of practice marks) increases by .14, .11, .16, .19, .13, .20, .19, .14 and .21 units only for *every unit increase* in the marks in the theory paper. It is obvious that the increase in Y' for every unit increase in X is very low and hence the accuracy of prediction is necessarily small. The lowest increase .11 in Y' is in case of the external practice teaching for every unit increase in X , internal theory marks.

TABLE 2
REGRESSION EQUATION AND SE OF PREDICTION

Regression of Y on X*	Regression Equation	S.E. of Prediction $\sigma_{y \cdot x}$
External Practice Marks		
1. External Theory	$Y' = .14X + 50.99$	4.18
2. Internal Theory	$Y' = .11X + 49.92$	4.01
3. Total Theory	$Y' = .16X + 48.11$	4.05
Internal Practice Marks		
4. External Theory	$Y' = .19X + 50.64$	7.12
5. Internal Theory	$Y' = .13X + 50.88$	7.09
6. Total Theory	$Y' = .20X + 48.07$	7.09
Total Practice Marks		
7. External Theory	$Y' = .19X + 49.68$	5.01
8. Internal Theory	$Y' = .14X + 49.20$	4.80
9. Total Theory	$Y' = .21X + 46.50$	4.86

* Y = Predictor X = Criterion

Here it may be pointed that "predictions based upon regression equations, however, are never (except in the case of perfect correlation) perfectly reliable". The standard errors were, therefore, calculated and are presented in Table 2.

The standard errors (σ_y) show that the average dispersion of the observed scores in practice marks about the best predicted line is very wide in all the cases. One of the characteristics of $\sigma_{y \cdot x}$ is that it is always less than the σ_y unless, of course, the traits are entirely unrelated, in which case $y \cdot x$ is equal to σ_y . It is clear from Table 2 that $\sigma_{y \cdot x}$ values in all the nine cases without any exception approach or are almost equal to σ_y .

The total picture that emerges from the above results is that there is practically no basis in this prediction. In other words the marks secured in the theory (methodology) paper are ill capable of predicting teaching success, at least for the present sample and under the conditions of this study.

The findings of this study are not startling at all for the simple fact that similar opinions have been expressed by various authors (Desi 1969, Shrivasth 1969, Rama 1968, Verma 1968, Morrison and McIntyre 1969) and various commissions (University Education Commission Report 1949, Education Commission Report 1966) from time to time.

A plausible reason for this state of affairs is that very few theoretical courses are about teaching, and that method courses, which are about teaching, have no theoretical foundations. It is in this reference that Bruner (1966) comments that 'there is a lack of integrating theory in pedagogy, in its place there is principally a body of maxims. Research on teaching has not provided us with anything like the empirical basis that might be required to justify and guide attempts to induce teaching skills, which would indicate to a teacher that if he increases behaviour X and/or decreases behaviour Y, there will be concomitant change in the cognitive or affective achievement of his students. Smith (1969) and his collaborators in their influential book *Teachers for the Real World*, have suggested that it is first necessary to identify, through empirical investigations and theoretical analysis, general categories of situations which teachers encounter, and then to determine the theoretical knowledge which would permit teachers to act more rationally in such situations; courses can then be planned to allow both a progressive mastery of relevant theory and a movement from relatively simple to more complex practical problems. The effectiveness of such courses is likely to depend on the availability of carefully chosen records of classroom situations

which exemplify the major characteristics of each type of situation, and which allow students to perceive the relevance and test the value of suggested theoretical analysis.

Moreover, there is a need to approach educational theory via practical situations. By and large, professors of education do not practice their principles of curriculum planning they so enthusiastically comment to future teachers. We teach students to be motivating and stimulating, but we are ourselves often dry and unimaginative (Kaltsounis and Nelson 1968). The findings of this study warrant that the teacher-educators and teacher education programmes must become aware of present breach between theory and practice and realize that a transformation is in order. Theoretical principles will have to be convincingly married to the practicalities of classroom teaching.

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An Experimental Study of the Effect of Dependency and Adjustment on the Achievement of Students Studying through Programmed Learning Material Using Different Response Modes

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THE programmed learning caught the sight of Indian researchers around 1963. Since that time, the programmed learning has been studied in its various aspects, namely, programmed approach vis-a-vis traditional approach to teaching; different forms of programmed learning materials; different uses of programmed learning materials; programmed learning for different subjects; programmed learning and instructional media; programmed learning and individual differences, and evolvement of instructional strategies. With reference to different modes of responding, many studies have been carried out (Goldback and Campbell 1962, Krumboltz *et al.* 1962, Silvermann *et al.* 1963, Tnel 1965, Leith and Gujman 1966, Krishnamurthy 1972). Of these, Krumboltz *et al.* (1962), Silvermann *et al.* (1963) and Tnel (1965) found that both overt as well as covert response modes were equally effective, whereas, Goldback and Campbell (1962), Leith and Gujman (1966) and Krishnamurthy

(1972) found that covert response mode was superior to overt response mode.

Looking into the importance of individual differences in the achievement of students through any instructional programme, several researches have been conducted to study the relationship between student characteristics and achievement through programmed learning. In this context, the various characteristics of the students which have been so far studied are intelligence, attitude towards programmed learning, mental age, academic motivation, English reading comprehension, etc. Apart from these variables, there are a few, such as, adjustment, dependence creativity, problem-solving ability, etc, which have not so far been studied. All these variables seem to have their bearing upon the achievement of students through programmed learning. In the present study the effect of dependency and adjustment separately on the achievement of students using different modes of responding, while reading the programmed learning material, have been studied.

Objectives

The following have been the objectives of the study .

1. To compare the achievement of students of experimental groups using overt and covert modes of responding and the group studying through traditional method.
2. To study the effect of dependency and the interaction between dependency and treatment on the achievement of students
3. To study the effect of adjustment and the interaction between adjustment and treatment on the achievement of students.

Sample

The study was carried over 115 Class IX female science students studying in two Hindi-medium higher secondary schools of the cities of Ujjain and Agar. Of 115 students, 48 students were assigned to experimental group one (G_1), 45 students to experimental group two (G_2), and 22 students were assigned to control group (C). All of these students were from average socio-economic strata of the society.

Design

The study employed experimental-control group design. There

were two experimental groups and one control group. The two treatments were assigned randomly to two experimental groups. The experimental group G_1 read the linear programmed learning material and wrote the responses on a separate page for each frame. That is, the response mode followed by group G_1 was overt responding. The experimental group G_2 read the same linear programmed learning material and did not write the response anywhere. That is, the response mode followed by group G_2 was covert responding. The control group was taught through the conventional method. The entering behaviours of the experimental groups were tested before giving the treatment and the terminal behaviours were tested after the completion of the treatment. The duration of the experiment was two weeks.

Tools

The pre-adolescent adjustment scale (PAAS) and pre-adolescent dependency scale (PADS) developed by Pareek and Rao (1971) were used to measure adjustment and dependency, respectively. The linear programmed learning material (PLM) on 'atomic theory and structure', pre-test and criterion test were developed by the investigators.

Data Collection

The students of the experimental groups were tested for entering behaviours by administering the developed pre-test. On the basis of this, it was made sure that all students possess the required entering behaviours. After this, the treatment was randomly divided among the experimental students. Each student of the experimental groups was given a copy of the linear programmed learning material. They were explained how to read through the PLM. The experimental group G_1 was told to read each frame and write the responses on a separate page. After writing the responses, they were to compare it with the correct response given below the frame. If the answer was correct, the students were asked to proceed to the next frame, but in case of wrong answer, they were instructed to read the frame again, and to find the reason why they have gone wrong. Thus, this group followed the overt response mode. The experimental group G_2 was asked to read the frame and think the correct responses for the read frame. The students were, then, to compare their responses with the correct responses given under the frame and to find whether their responses were correct or not. In case of correct responses, the students were instructed to proceed further, whereas, in case of wrong responses, they were to read the frame

again and to find the reason for their being wrong. Thus, this group followed the covert response mode. The control group was taught the same topic in the regular classroom in the conventional way. After the completion of the topic by the students of experimental as well as control groups, they were tested on the criterion test. The PASS and PADS were administered to all the students and their responses were scored according to the directions given in the respective manuals.

Results and Discussion

1. *Effect of dependency on achievement* : The first objective of the study was to find out the effect of dependency, treatment and the interaction between them on achievement of students on criterion test. The students of groups G_1 , G_2 and C were divided into two groups, namely, highly dependent and low dependent on the basis of mean dependency scores of the three groups. Thus, there were two levels of dependency and three levels of treatment. Hence, the data were analysed by using factorial 2×3 analysis of variance with unequal cell size. The results are given in Table 1.

TABLE 1
SUMMARY OF ANALYSIS OF VARIANCE FOR ACHIEVEMENT
ON CRITERION TEST

<i>Source of variance</i>	<i>df</i>	<i>SS</i>	<i>MS V</i>	<i>F</i>
Dependency	1	1.58	1.58	0.63
Treatment	2	24.14	12.07	4.88**
Dependency x Treatment	2	13.09	6.54	2.63
Error	109	272.00	2.49	

**Significant at 0.01 level

From Table 1, it may be seen that the F-value of 0.63 is not significant. It means that the students belonging to the highly dependent group did not differ significantly in mean achievement on criterion test than those belonging to low dependent group. In other words, the degree of dependency of students did not influence significantly their achievement. This finding justifies the individualized nature of programmed learning material because each learner learns through the programmed learning material at his own pace and no extra help is needed which determines the level of dependency,

The F -value for the effect of treatment is 4.84, which is significant at 0.01 level with df of 2/109 (vide Table 1). It indicates that the mean achievement of students of the three groups, namely G_1 , G_2 and C , differed significantly. On analysing the means it was found that the mean achievement of group G_1 as well as group G_2 was significantly higher than that of control group. On the other hand the mean achievement of group G_1 did not differ significantly from that of group G_2 . It shows that studying through the linear programmed learning material either by following overt response mode or covert response mode was superior than studying through the conventional way of teaching. Further, both overt as well as covert response modes were found to be equally effective. This finding is in line with those of Silvermann *et al.* (1963), Krumboltz *et al.* (1962) and Tel (1965), whereas it is in contradiction with the findings of Goldback and Campbell (1962), Lenth and Gujman (1966) and Krishnamurthy (1972) who have reported that covert response mode is superior to the overt response mode.

Lastly, the F -value for the interaction between dependency and treatment is 2.63 which is not significant (vide Table 1). This means that the interaction between dependency and treatment did not effect significantly the achievement of students on the criterion test.

2. *Effect of adjustment on achievement* : The second objective of the investigation was to study the effect of adjustment and the interaction between adjustment and treatment on achievement of students on criterion test. The students of groups G_1 , G_2 , and C were divided into two groups, namely, highly adjusted and low adjusted on the basis of mean adjustment score of the three groups. Thus, there were two levels of adjustment and three levels of treatment. Hence, the data were analysed by employing factorial 2×3 analysis of variance with unequal cell size. The results are given in Table 2.

TABLE 2
SUMMARY OF ANALYSIS OF VARIANCE FOR ACHIEVEMENT
ON CRITERION TEST

Source of variance	df	SS	MS	F
Adjustment	1	6.27	6.27	3.15
Treatment	2	19.86	9.93	4.99**
Adjustment x Treatment	2	18.26	9.13	4.59*
Error	109	216.76	1.99	

*Significant at 0.05 level

**Significant at 0.01 level

From Table 2, it may be seen that the F-value for the effect of adjustment is 3.15, which is not significant. It reflects that the students belonging to high adjustment group did not differ significantly in mean achievement from those belonging to low adjustment group. Thus, the achievement of students on criterion test is independent of adjustment of students. This might be because each student worked independently during the programmed learning session. Hence, the problem of adjustment does not arise.

The results and discussion pertaining to the effect of treatment on achievement of students has already been dealt under the heading 'effect of dependency on achievement'.

The F-value for the effect of interaction between adjustment and treatment is 4.59, which is significant at 0.05 level with df of 2/109 (vide Table 2). It indicates that there is a significant effect of interaction between adjustment and treatment on achievement of students on criterion test. The students having high adjustment benefited equally while studying through PLM or conventional teaching. On the other hand, students having low adjustment benefited more while studying through the linear PLM as compared to conventional teaching. It may, therefore, be said that the linear PLM with overt as well as covert response modes was suitable to both students having high adjustment as well as low adjustment.

Conclusions

The following are the outcomes of the present study :

1. The mean achievement of students using covert as well as overt modes of responding while studying through the programmed learning material have been found significantly higher than those studying through traditional method.
2. Both the overt as well as covert modes of responding have been found equally effective in influencing the achievement of students.
3. There has not been significant effect of dependency on achievement of students.
4. The interaction between dependency and treatment does not seem to cause significant variation in the achievement of students.
5. There has not been significant effect of adjustment on achievement of students.

6. There has been a significant effect of interaction between adjustment and treatment on achievement of students.

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Book Reviews

Das's Theory of Intelligence

Simultaneous and Successive Cognitive Processes, J. P. DASS, JOHN R. KIRBY and RONALD F. JARMAN. Academic Press, New York, 1979, Price : £ 17 50.

WITH the emergence of psychology as a science, the study of cognitive abilities and their measurement has been at the centre of the history of development of psychology. Galton was attracted by the genius and attempted to study the characteristics of genius. Binet, on the other hand, wanted to know why some children fail in learning in school. Instead of following the methodology developed by the experimental psychologists in Wundt's laboratory at Leipzig, and instead of being concerned with the processes of learning, or with cognitive processes which lead to acquisition of knowledge, which is, after all, what a school is supposed to be concerned with, Binet struck a new path, which led him to a major discovery of psychology, viz. intelligence test. He gave to psychology a new methodology of instrumentation, and instrumentation is a characteristic of science without which the concepts remain fuzzy. By measuring an identifiable phenomenon, a scientist achieves precision in thinking. Binet, in collaboration with Simon, developed a series of tests to measure intelligence, over the years from early childhood to the end of school years. Binet was satisfied to find an answer to the question why some children do not learn in school? His answer was because they do not have the necessary intelligence.

Had Binet chosen to follow the path of Piaget, his answer would have been different; but then psychology would not have received the attention it did, because the I.Q. concept which came out of Binet's

work would not have been born. Whether it would have been better, we do not know. But, historically, psychometrics and experimental psychology branched off in different directions from that point on. It is only in recent times, there are no signs of convergence of the two lines of psychological work. The work of Das and his collaborators is an indication of this convergence.

Das has a great design. Like some of the creative scientists in other sciences, Das has conceptualized two basic cognitive functions, viz. coding and planning underlying the diverse manifestation of abilities in human behaviour, as measured by psychological tests. Two processes identified by him within the coding function, viz. simultaneous and successive processing. He uses the word 'function', 'process' synonymously, and therefore, coding may be regarded as subsuming simultaneous and successive processes. Planning process is distinguishable from coding, but Das has not identified specific processes subsumed under planning. He relates both coding and planning to intelligence as measured by tests.

Das sticks to the original use of intelligence test in the hands of Binet, and holds the view that intelligence tests only measure schooling, and they provide an alternative measure of school attainment. Intelligence tests are measures of abilities, but do not clearly indicate the intellectual processes underlying the abilities. In the very opening chapter of the book, these views are stated very clearly and succinctly, a stylistic quality which characterizes this book all through, and to the present reviewer is like breathing fresh air, which otherwise gets murky in lesser hands. Thus, it is stated clearly that mental functions are looked upon as coding and decision-making processes. Coding consists of input, recording and storage of information. Decision processes are formulation and realization of plans. The model is a simple computer model, but Das relates it to the human brain and its three blocks as identified by Luria.

A brief review of research on intelligence leads Das to the view that intelligence is a cognitive construct and any theory of intelligence should draw upon the research in cognitive development of the child, cognitive learning psychology, clinical neuro-psychology as well as differential psychology. This is the wide canvas of Das's thinking and the research presented in this book shows how painstakingly and imaginatively he and his collaborators are moving within the ambit of a grand design.

The contribution of Soviet psychology towards a theory of intelli-

gence based on the brain functions is presented briefly, but clearly. Carrying forward the Pavlovian notion of a second signal system, Voronin makes a distinction between verbally mediated conditioned responses and those which are not so mediated, and this distinction is vital for the understanding of stable learning with quick transfer in man, as against unstable learning and difficult transfer in animals. Thus, language plays a critical role in higher mental processes in man, which according to Vygotsky have a social rather than biological origin. But Soviet psychology assumes a neural base of mental functions and so the neurophysiology of brain receives a lot of attention. Luria's work with the brain has led to an identification of three blocks of brain, which are functional systems, cutting across the anatomically noticeable structures of the brain. Luria identifies the reticular formation as responsible for activation or arousal, but also enters into programming and planning, mediated by language, which processes depend on the frontal lobes as well. This is Block 1 of Luria. Block 2 covers occipital, temporal and parietal lobes and is concerned with obtaining, processing and storing information. This block as a functional unit is organized hierarchically into primary, secondary and tertiary zones. Block 3 is responsible for planning and programming of behaviour. It is located in the frontal lobes but in the region anterior to the precentral gyrus. The above is a gist of what the book gives in much greater details and is meant only to indicate that Das finds Luria's three blocks of brain a convenient neurophysiological base for his theorizing on the simultaneous and successive processing. But to the present reviewer it does not appear to be necessary for Das to link up with Luria's work to prove his point that intelligence lies in coding and decision-making and that coding involves simultaneous and successive processing. However, Das goes at length to show how his conceptualization of simultaneous and successive processing is derived from a century old work of Sechenov. But he goes further back in time and invokes no less an authority than the great German philosopher Immanuel Kant to prove that organization of sensory data takes place in the mind in terms of space and time which are innate. The information processing model of intelligent behaviour developed by Das and his colleagues were presented in 1975 in an article in the *Psychological Bulletin*. This is summarized in the book.

The tests by which simultaneous processing is measured are Raven's Coloured Progressive Matrices, Figure Copying and Memory of Designs. Successive processing is measured by Digit Span, Visual Short-term Memory and Serial or Free Recall.

Kirby study reported in 1976 is described in detail as a representative study of Das's model, Kirby had 104 fourth-grade boys and 98 fourth grade girls in his sample and the tests mentioned above were taken by these children in the sample. The inter-correlations were factor analysed using the principal components model with varimax rotation. The interpretation of the factors support the theory. Three factors were identified as simultaneous, successive and speed, the last being identified by two tests, Word Reading and Colour Naming.

In another study children in grades 1 and 4 were compared and the same factor patterns emerged.

A number of studies show the relationship between simultaneous and successive processing and school achievement. A separate school achievement factor was identified and is comparable to Varnon's V: Ed factor. Regression analysis shows that school achievement depends on both simultaneous and successive processing. Mathematics achievement seems to depend more on simultaneous processing which being measured by Raven's Coloured Progressive Matrices Test, supports the idea that mathematics depends more on factor 'g' than anything else.

Das has done considerable work with mental retardation and learning disability. There is a whole chapter in the book devoted to the conceptual, methodological and empirical issues regarding mental retardation and learning disability. The view taken by the authors is that mental retardation is not basically different factorially from intelligent behaviour. The fault lies in strategies used by the retarded.

Cross-cultural research is considered next. Of interest to us in India are the studies by Das on caste and class which have appeared earlier in journals. Das found rural-urban differences as well as upper and lower castes differences, the urban being better than rural and the upper caste being better than the lower caste in the three factors: Simultaneous, successive and speed. Tribal children in India also suffer as much as the lower caste in Das's study. No differences were, however, found between black and white samples in Canada, but the white children were found superior to the native, i.e. tribal children. Of course, Das's interest was not in assessing the superiority or otherwise of one cultural group over another. The cross-cultural research is discussed only to indicate that all cultural groups do not emphasize simultaneous and successive processing; some emphasize one, where other groups emphasize the other processes. This kind of difference in cognitive processes is more important for Das's theory rather than difference in abilities.

It is interesting to note that Das uses principal components analysis with varimax rotation to test his hypotheses. Usually, one uses factorial

designs of experiments to reject the null hypotheses with the powerful F-test. Das, however, uses factor analysis to prove that simultaneous and successive processes plus speed underlie the usually known intelligence tests. Otherwise the treatment effects observed in research on intelligence tests on clearly identifiable and different groups are found even in Das's results. Only the social stigma that gets attached to some groups found to be low in intelligence is avoided, because Das talks of process differences, and not of differences in ability. But, basically, the results are the same. Hence, at the end, Das takes great pains to prove the construct validity of the tests and goes into great lengths in showing that alternative cognitive models presented by the theory of intelligence, cognitive styles, cognitive learning theory, cognitive developmental theory and theories of brain function do not really challenge his theory of simultaneous and successive processes, rather, these theories contribute to his theory in some way or the other, and ends with a hopeful note of developing an integrated perspective. A point in favour of Das's theory in improving deficits through properly planned intervention strategies.

There is a chapter towards the end of the book by James P. Cummins on language functions and cognitive processing, where Cummins analyses research evidence from aphasia and some linguistic functions, and finds that process rather than ability interpretation, following Das, is a better explanation of research results.

The last of the eleven chapters in the book is devoted to a general discussion of the concept of intelligence and the neuropsychological approaches to the study of intelligence, learning disability, hyperactivity and developmental issues and how the process approach of Das helps.

In the appendix, one finds a general manual for tests of simultaneous and successive processing and speed of processing, which should be useful for any researcher wishing to replicate some of the studies quoted in the book. There are ten tables, one for each test used, containing the name of the researcher and the year of publication, a brief description of each group studied and its size, mean, standard deviation and factor loading.

There is a list of references at the end.

The present reviewer is of the opinion that Das and his collaborators (to save space only Das has been mentioned throughout) have broken new grounds in their work which should receive wide and serious attention from psychologists and educationists, no matter what their indi-

vidual biases may be. The book has been printed very well and the presentation is worthy of emulation by scholars for its lucidity, brevity and organization. The present reviewer has no hesitation in recommending this book as a compulsory reading for all postgraduate students of psychology. This book is surely one which should adorn the shelves of any library which caters to scholars.

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Problems of Indian Education

Problems in Indian Education. V. T. PATHI AND D. C. PATHI. Oxford and IBH Publishing Co., New Delhi, 1982, pp. 168+ vii. Price : Rs. 36.00.

THIS attractive and fascinating volume is a praiseworthy attempt of the authors in identifying some of the major problems of Indian education and to throw light on the contemporary educational scene and academic situation in India—an evolving and emerging democratic society. The basic assumption underlying this work, according to the authors, is that socio-economic development and political stability can come about only through meaningful changes in the techniques, methods, processes, and philosophy of Indian education. They believe that a careful and cautious diagnosis of the problems and their underlying cross-currents is a pre-requisite of such endeavours at academic excellence and improvement. In the seventeen chapters of the book, the authors have discussed some crucial issues in the field of Indian education—the language controversy, education and social change, vocational education, non-formal education, teachers and effective teaching, population education, student activism, value crisis, and universities and rural reconstruction. The description and discussion of the varied problems is lively, pinpointed and at times neatly critical. However, such valuable presentation, wherever necessary, has been

followed by offering of the solutions to some of these maladies, and the suggestions are timely, practical and implementable. These prescriptions may be useful eye-openers for the government and may provide an insight to the national leaders and policy-makers. These will definitely interest, inspire and enrich academic workers and will thrill the students and scholars in Indian universities and colleges who are studying education as a discipline and have evolved as prospective teachers in the variety of teacher-preparation programmes in the various states of India.

The book rightly opens with a discussion of the linguistic problems faced by students, parents, and educators. Chapter 2 examines the interaction between education and leadership. Chapter 3 highlights the contents and relevance of Mahatma Gandhi's philosophy of education. Chapter 4 explains the role of universities in rural reconstruction. Vocational education, non-formal education and adult education have been described and evaluated in chapters 6, 7 and 9 and it has been spotlighted how education can act as a harbinger of socio-economic revolution. Chapter 5 defines social change and explains how education can accelerate desirable changes in societal make-up and forge a social consciousness in students and educators. The problems of national integration and international understanding have been brought to a sharp focus in chapters 8 and 10 and it becomes evident that internal national oneness alone will not suffice in the present-day world of scientific and technological advancement. There is a visible need for internationalism as a creed because this idea is not all-pervading concern to peoples of all nations in the contemporary world. Chapter 12 delineates the concept of open university and its importance for a developing country. Chapters 11 and 16 provide a good exposition of the pivotal place of the teacher and his role in effective teaching and in making and moulding the contours of democratic India. There is no doubt that teachers have a big responsibility in shaping and sharpening the factors and forces which alone can transform the dream of democracy into an actuality and a reality. Chapter 13 highlights the relevance of population education and suggests how the programmes of population education can provide the foundation for social unity and stability, orderly and peaceful political change and a reasonable rate of economic development. Chapters 14 and 15 are fascinating—the first investigates the anatomy of student activism and the second identifies the nature of value crisis in education. The authors have rightly analysed that in student activism in India non-ideological factors have a higher predomi-

nance and reliance than merely ideological factors. Their advocacy for value-oriented education as a panacea for educational ills is also timely. Chapter 17 is the grand finale of the musical sympathy wherein the authors have dived deeper into the recesses of educational problems and have propagated the need for change—drastic but not deadly, democratic and not dictatorial. Their reflections on examination reforms, policies for starting new universities, delinking degrees from jobs, institutional autonomy, and introduction of new courses are pedagogically sound and deserve our special attention and consideration.

To be precise, the essays in the book not only have a contemporary value but also make significant contribution to education specially to educational theory and practice in a developing nation. The ideas of the authors, specially their findings and suggestions need cautious trials and sincere implementation on experimental basis before large-scale, wide application. It is hoped that such an active and analytic experimentation, if initiated, will solve many educational problems and will settle the long-standing issues permanently on a sound rationale.

The present book will interest a variety of serious readers—students, parents, educators and educational scientists. Even the casual readers—tourists, housewives and busy bureaucrats will also find much meat in it and will enjoy the contents as its mode of presentation is quite stimulating. The book will sell like the proverbial hot cake.

Before I conclude I will like to make two observations. Firstly the cost of the cloth-bound volume is really prohibitory for an average Indian reader—student or educator. There is need to bring out its paperback edition immediately so that such a useful book on half its present price reaches easily every interested person. Secondly, some issues need be included in its next edition. I wish the authors should add chapters on brain-drain, education of minorities, tribal education, meritocracy in higher education and educational research in the revised and enlarged edition as and when it is planned.

S. P. AHLUWALIA, Professor and Dean, Faculty of Education
University of Saugar.

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